697.1

No. 400

Steamfitters' HANDBOOK

OF

Boilers and Radiators

The H. B. Smith Co.

728 Arch St., Philadelphia, Pa.

Works:
Westfield, Mass.

Salesroom:
133 Centre Street
New York, N.Y.

1907

1853 — 1907

The H. B. SMITH CO.

MANUFACTURERS OF

Boilers *and* Radiators

WESTFIELD, MASSACHUSETTS
U.S.A.

Salesrooms

133 CENTRE STREET, NEW YORK, N.Y.

728 ARCH STREET, PHILADELPHIA, PA.

SEE PAGE 8

THE FIRST EDITION of this handbook was published with the purpose of combining within a convenient space as much useful information concerning our manufactures as could be thus assembled. We believed that such a publication would meet the desires of our customers, and serve to further our mutual interests.

That the book has proved of value is shown in the expressed appreciation of the trade at large, and by such an active and steady demand for the work as to quickly exhaust four editions and encourage us in the publication of this, the fifth.

In compiling this edition, the old style material, no longer carried in stock, has been omitted, and considerable new matter has been added in the way of outline drawings and descriptive data; and it is our hope that the book may prove of much practical use to our friends, and promote the continuance of their favor and patronage.

THE H. B. SMITH CO.

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BOILER RATINGS

STEAM BOILER ratings are based on maintaining two pounds pressure at the boiler.

WATER BOILER ratings are based on the water being maintained at a temperature of 180 degrees at the boiler.

Sufficient surface must be proportioned to easily raise and maintain a temperature of 70 degrees.

These ratings are for DIRECT RADIATION.

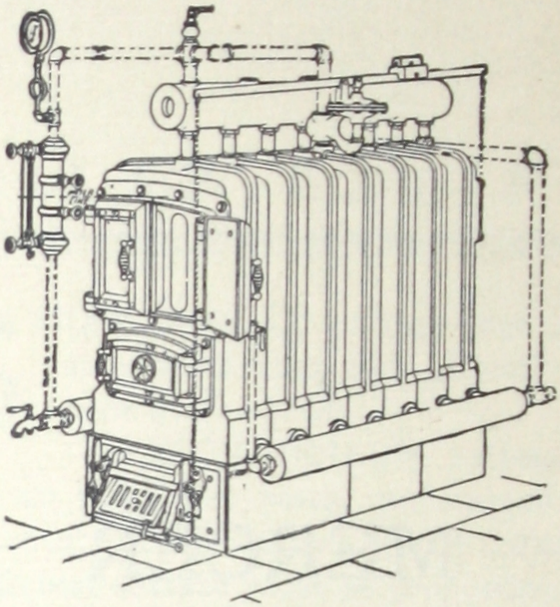
In estimating the size of the boiler required, all pipings (Mains and Risers, Flows and Returns) should be figured as radiating surface in addition to the cast iron Direct Radiators.

Usual allowances must be made for the use of Pipe Coils, Direct-Indirect and Indirect Radiation.

MERCER

BOILER

MERCER BOILER



No. 18 Steam

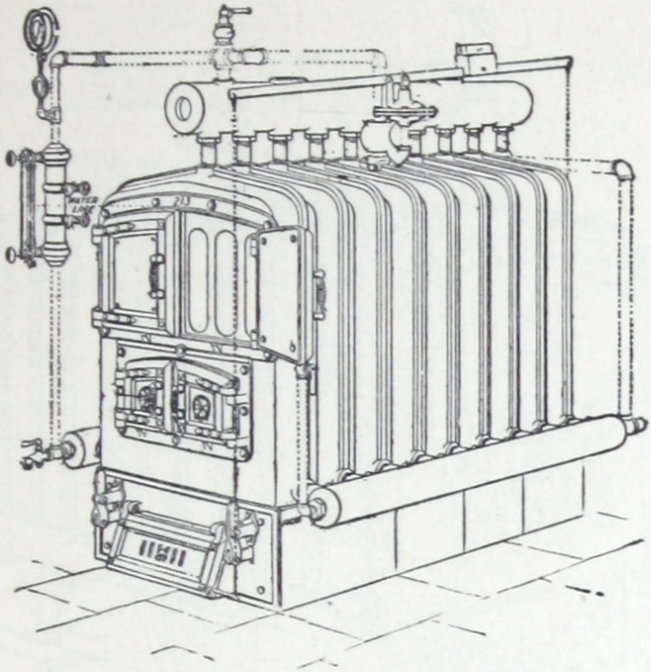
Ratings

Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating† Sq. Feet	Price
4	18 x 18	2¼	54	375	**$170**
5	18 x 24	3	66	500	**207**
6	18 x 30	3¾	78	625	**239**
7	18 x 36	4½	90	775	**276**
8	18 x 42	5¼	102	925	**313**
9	18 x 48	6	114	1075	**350**
10	18 x 54	6¾	126	1175	**377**
11	18 x 60	7½	138	1275	**400**
12	18 x 66	8¼	150	1375	**426**

*See Page 17.

†See Page 4.

MERCER BOILER



No. 27 Steam

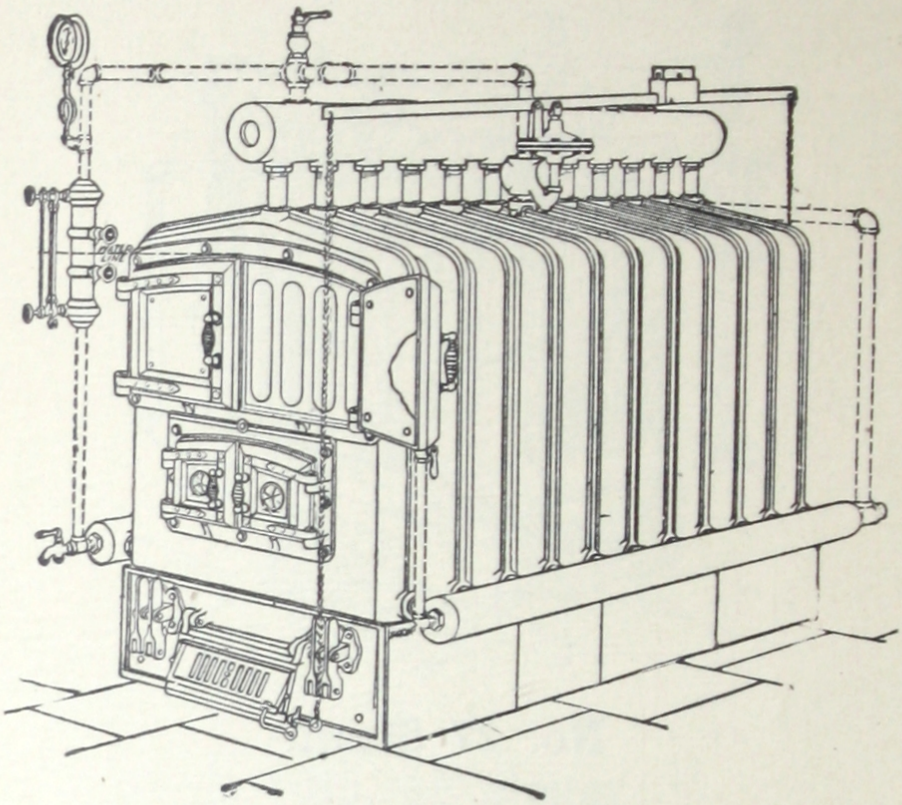
Ratings

Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating† Sq. Feet	Price
6	27 x 30	5 5/8	117	1150	$370
7	27 x 36	6 3/4	135	1350	420
8	27 x 42	7 7/8	153	1550	470
9	27 x 48	9	171	1800	533
10	27 x 54	10 1/8	189	2050	595
11	27 x 60	11 1/4	207	2300	652
12	27 x 66	12 3/8	225	2550	705
13	27 x 72	13 1/2	243	2800	752
14	27 x 78	14 5/8	261	3050	795
15	27 x 84	15 3/4	279	3300	835
16	27 x 90	16 7/8	297	3550	877

*See Page 17.

†See Page 4.

MERCER BOILER



No. 36 Steam

Ratings

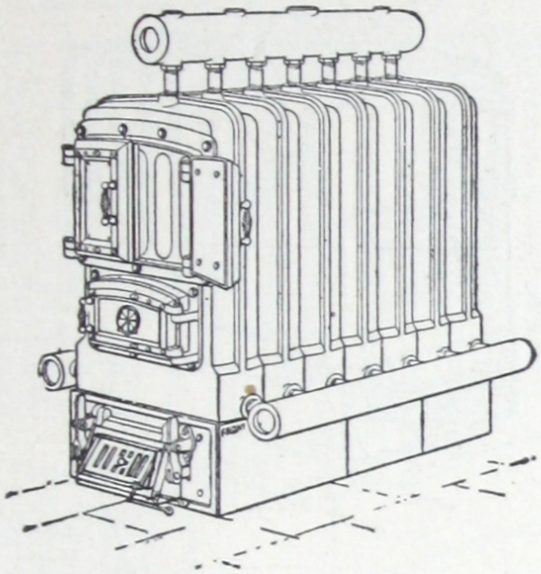
Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating † Sq. Feet	Price
7	36 x 36	9	180	1900	**$557**
8	36 x 42	10½	210	2200	**630**
9	36 x 48	12	240	2500	**694**
10	36 x 54	13½	270	2850	**761**
11	36 x 60	15	300	3200	**819**
12	36 x 66	16½	330	3600	**885**
13	36 x 72	18	360	4000	**952**
14	36 x 78	19½	390	4400	**1019**
15	36 x 84	21	420	4800	**1085**
16	36 x 90	22½	450	5200	**1152**

NOTE. — No. 36 Mercer Boilers of more than eight sections of grate are arranged with four shaking levers.

*See Page 17.

†See Page 4.

MERCER BOILER



No. 18 Water

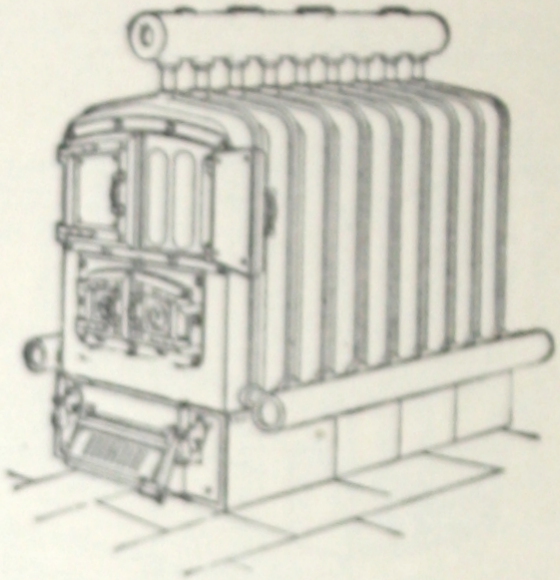
Ratings

Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating† Sq. Feet	Price
4	18 x 18	2¼	54	625	$160
5	18 x 24	3	66	825	197
6	18 x 30	3¾	78	1025	229
7	18 x 36	4½	90	1275	266
8	18 x 42	5¼	102	1525	303
9	18 x 48	6	114	1775	340
10	18 x 54	6¾	126	1950	367
11	18 x 60	7½	138	2100	390
12	18 x 66	8¼	150	2250	416

*See Page 17.

†See Page 4.

MERCER BOILER



No. 27 Water

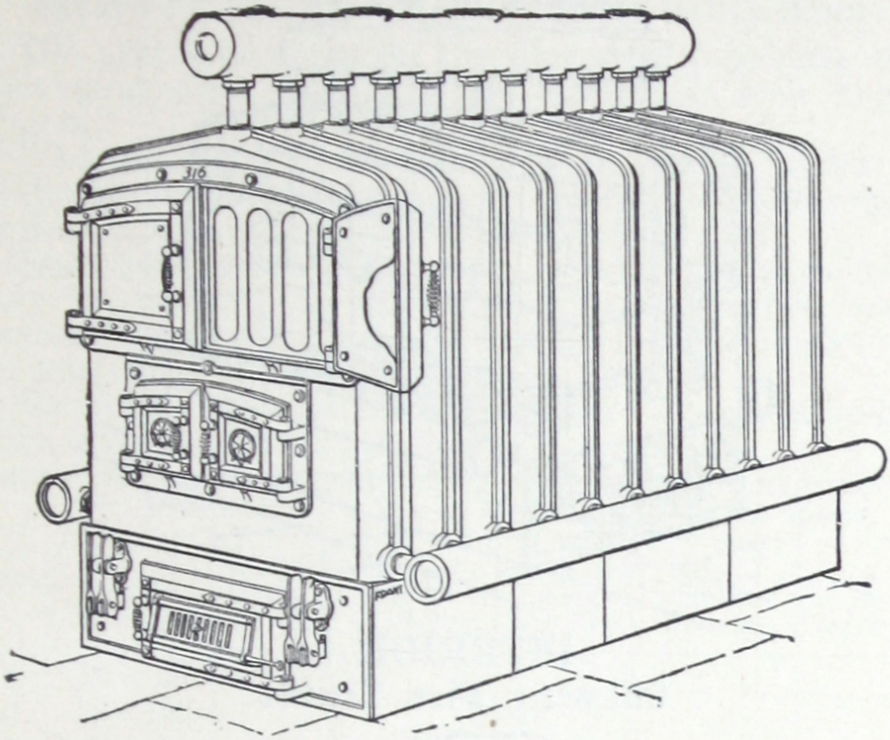
Ratings

Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating† Sq. Feet	Price
6	27 x 30	5¼	117	1900	$360
7	27 x 36	6¼	135	2225	410
8	27 x 42	7¼	153	2550	460
9	27 x 48	9	171	2975	523
10	27 x 54	10¼	189	3375	585
11	27 x 60	11¼	207	3800	632
12	27 x 66	12¼	225	4200	685
13	27 x 72	13½	243	4625	732
14	27 x 78	14¼	261	5025	775
15	27 x 84	15¼	279	5450	815
16	27 x 90	16¼	297	5850	857

* See Page 17.

† See Page 4.

MERCER BOILER



No. 36 Water

Ratings

Sections	Size of Grate* in inches	Area of Grate Sq. Feet	Area of Fire Surface Sq. Feet	Rating† Sq. Feet	Price
7	36 x 36	9	180	3125	$547
8	36 x 42	10½	210	3625	610
9	36 x 48	12	240	4125	674
10	36 x 54	13½	270	4700	741
11	36 x 60	15	300	5275	799
12	36 x 66	16½	330	5950	865
13	36 x 72	18	360	6600	932
14	36 x 78	19½	390	7250	999
15	36 x 84	21	420	7925	1065
16	36 x 90	22½	450	8575	1132

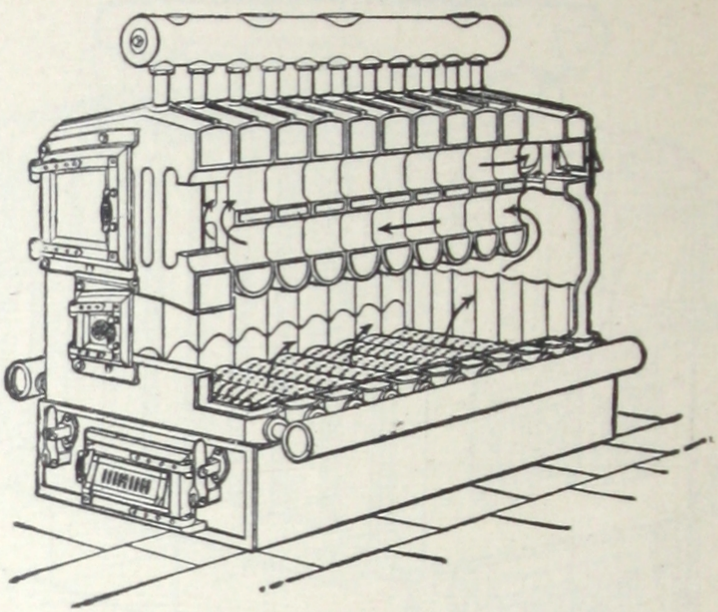
NOTE. — No. 36 Mercer Boilers of more than eight sections of grate are arranged with four shaking levers.

*See Page 17.

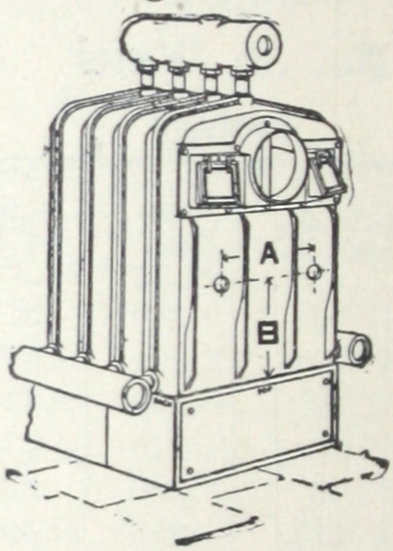
†See Page 4.

MERCER BOILER

Steam or Water



INTERIOR
Showing Fire Travel



REAR
Showing Holes for Domestic Supply
Dimensions in Inches

DIMENSIONS	No. 18	No. 27	No. 36
Size of Pipe used	1	1¼	1¼
A	12	18	15
B	18¼	14	20

MERCER BOILER

Steam or Water. Reduction of Grate Area

The grates as given on the preceding pages are the maximum sizes that can be furnished with these boilers.

When boiler is connected with flue having favorable draft conditions, the engineer or heating contractor may decide that the size of grate should be reduced.

The reduction of the grate area in Mercer boilers may be effected by placing in position a fire back section, forming the back of the fire pot as illustrated on pages 20 and 21.

The following sizes have been found adequate under very favorable draft conditions:

Sections	No. 18 Mercer		No. 27 Mercer		No. 36 Mercer	
	Size of Grate in inches	Area of Grate Sq. Ft.	Size of Grate in inches	Area of Grate Sq. Ft.	Size of Grate in inches	Area of Grate Sq. Ft.
4	18 x 18	2¼	.....	.....	.....	.....
5	18 x 24	3	.....	.....	.....	.....
6	18 x 30	3¾	27 x 30	5⅝	.....	.....
7	18 x 36	4½	27 x 36	6¾	36 x 36	9
8	18 x 42	5¼	27 x 42	7⅞	36 x 42	10½
9	18 x 48	6	27 x 48	9	36 x 48	12
10	18 x 48	6	27 x 54	10⅛	36 x 54	13½
11	18 x 54	6¾	27 x 54	10⅛	36 x 60	15
12	18 x 54	6¾	27 x 54	10⅛	36 x 60	15
13	.....	.....	27 x 60	11¼	36 x 60	15
14	.....	.....	27 x 60	11¼	36 x 66	16½
15	.....	.....	27 x 66	12⅜	36 x 66	16½
16	.....	.....	27 x 66	12⅜	36 x 66	16½

SPECIAL NOTICE

Unless otherwise specified, Mercer boilers are shipped with grate as per above. *Specify on order the length of grate required.*

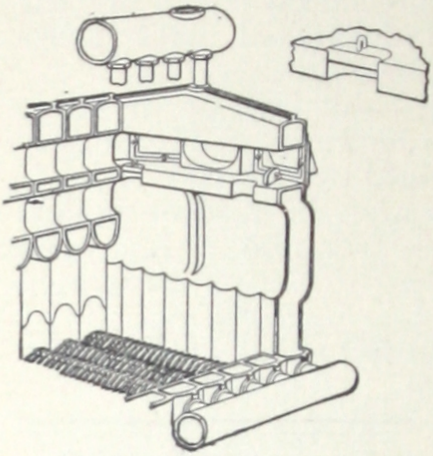
FIRE TOOLS FURNISHED

Flue brush (with handle), hoe, poker and shovel.

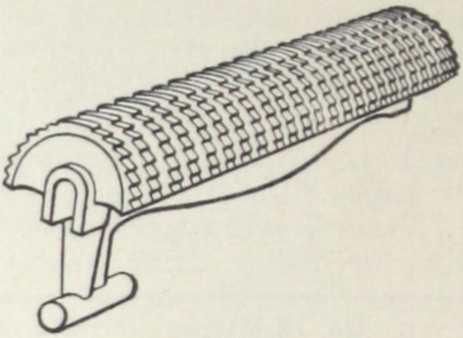
TRIMMINGS FURNISHED WITH STEAM BOILERS

Water column, gage cocks, water gage cocks, water gage glass, pop safety valve, steam cock, steam gage (with cock), steam gage syphon, diaphragm complete, and jack chain (3 yards).

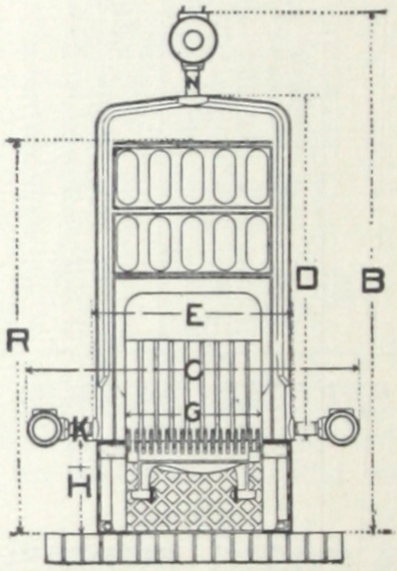
MERCER BOILER



EXTREME BACK
Showing Clean-Out Plugs



GRATE BAR
Used in all Mercer Boilers

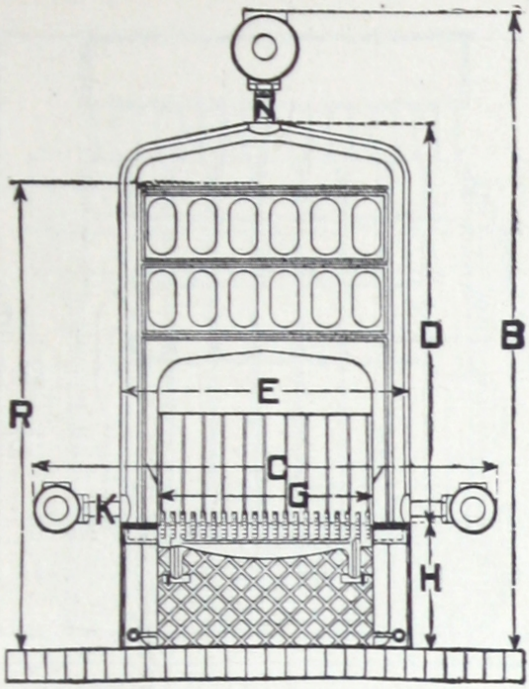


No. 18 Mercer

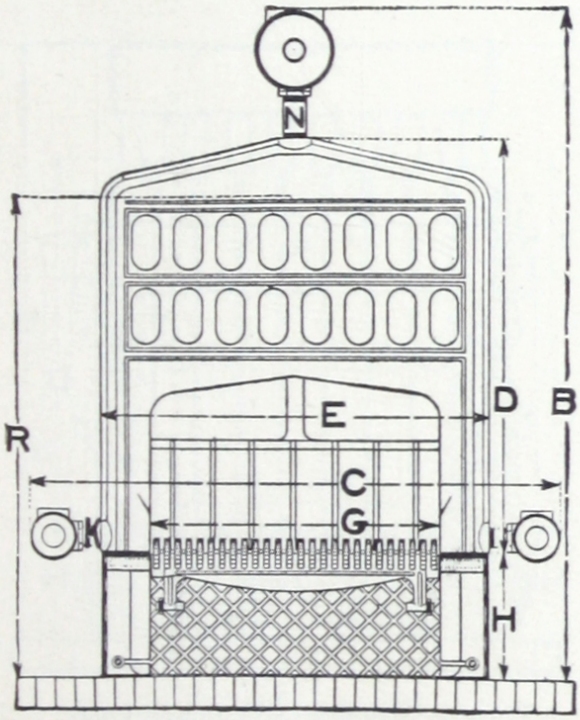
Front Removed

For dimensions, see page 22.

MERCER BOILER



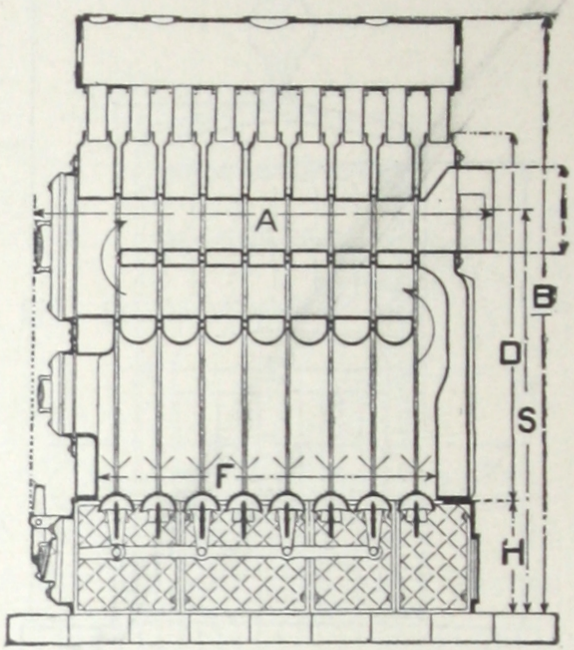
No. 27 Mercer
Front Removed



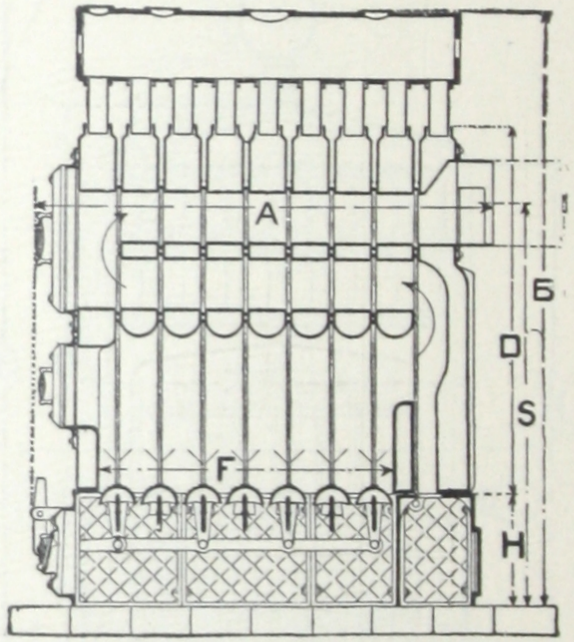
No. 36 Mercer
Front Removed

For dimensions, see page 22.

MERCER BOILER



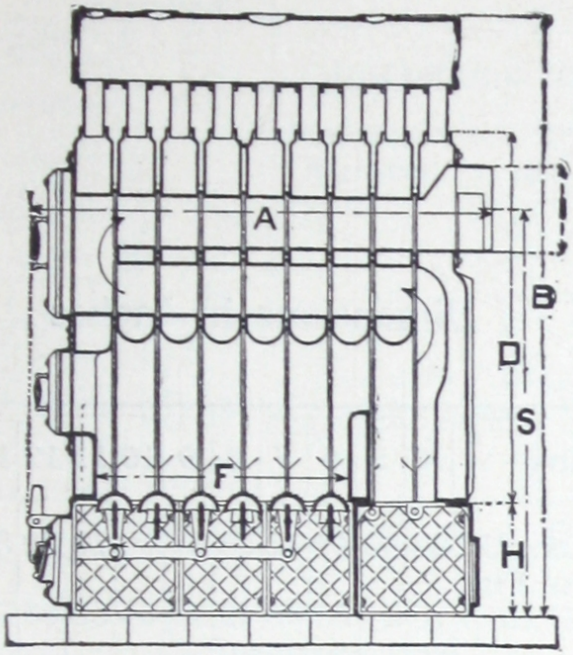
Longitudinal Section
Grate Full Size



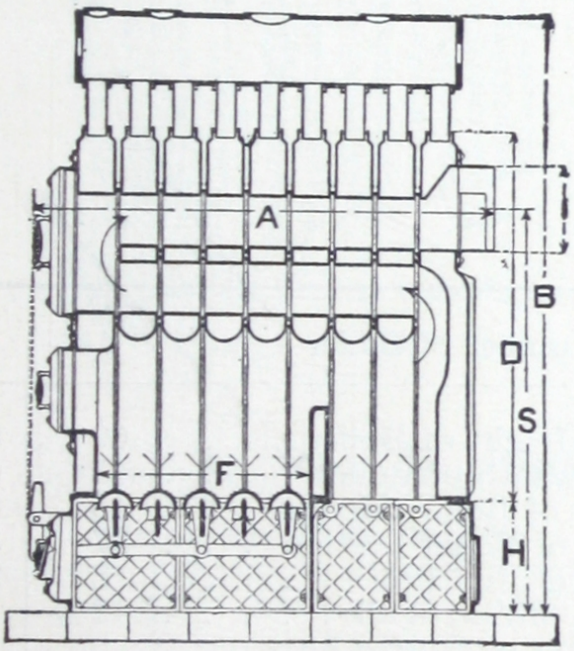
Longitudinal Section
Grate Reduced Six Inches

For dimensions, see page 22.

MERCER BOILER



Longitudinal Section
Grate Reduced Twelve Inches



Longitudinal Section
Grate Reduced Eighteen Inches

For dimensions, see page 22.

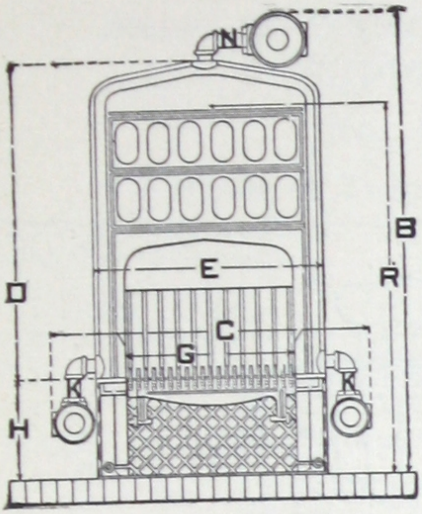
MERCER BOILER

Dimensions in Inches

Sections	4	5	6	7	8	9	10	11	12	13	14	15	16
A Total Length.	34	40	46	52	58	64	70	76	82	88	94	100	106
F Length of Fire Pot (full size)	18	24	30	36	42	48	54	60	66	72	78	84	90

Number of Boiler	18	27	36
B Total Height of Boiler	69	80	83
C Total Width of Boiler	45	60	70
D Height of Boiler Section . . .	45	50	52
E Width of Boiler Section . . .	27	37	48¾
G Width of Fire Pot	18	27	36
H Height of Ash Wall	12½	16	16
I Diameter of Smoke Pipe . . .	9	12	14
K Size of Return Drum Nipple .	1½	1½	2
N Size of Supply Drum Nipple .	1½	2	2½
R Height of Water Line	51	57	59
S Height to center of Smoke Pipe	48	55	57

MERCER BOILER

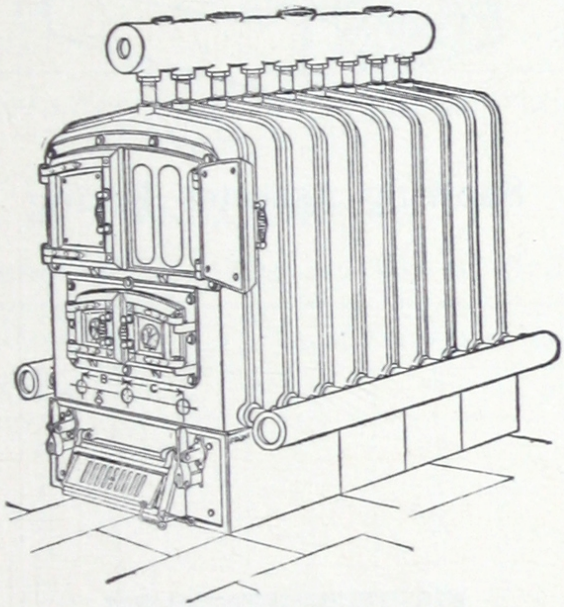


Dimensions in Inches

Number	18	27	36
B	63	73	78
C	37	50½	67

For other dimensions, see opposite page.

Height and Width of Boiler Reduced



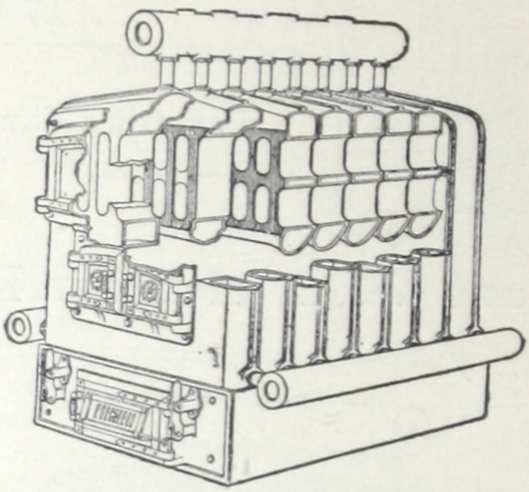
Special for Gas Burning

Dimensions in Inches

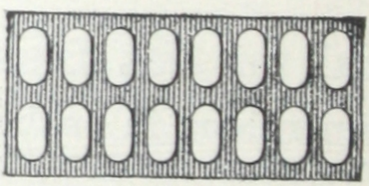
Number of Boiler	18	27	36
A	3⅜	3⅛	4
B and C	6⅜	10½	14

NOTE. — If Boiler is to be cored for gas burning, so specify on order.

MERCER BOILER



Showing Asbestos Facing



Asbestos Facing

Placed between all sections

MERCER BOILER

Steam or Water. Regular Tapping*

SUPPLY DRUM

No. 18 Mercer

Number of Tappings on Top of Drum

Number of Sections		Size of Tapping in inches				
Steam	Water	1¼	1½	2	2½	3
.....	4	1	.....	2	.....	1
4	5	1	.....	2	.....	1
5	6	.....	1	2	.....	1
6	7	.....	1	2	.....	1
7	8	.....	.....	3	.....	1
8	9	.....	.....	1	2	1
9	10	.....	.....	1	2	1
10	11	.....	.....	.....	3	1
11	12	.....	.....	.....	3	1
12	.....	.....	.....	.....	3	1

Outside diameter, 6 inches. Each end tapped for 2½-inch Pipe.

No. 27 Mercer

Number of Tappings on Top of Drum

Number of Sections		Size of Tapping in inches				
Steam	Water	2	2½	3	3½	4
.....	6	1	.....	2	.....	1
6	7	1	.....	2	.....	1
7	8	.....	1	2	.....	1
8	9	.....	1	2	.....	1
9	10	.....	1	.....	.....	3
10	11	.....	.....	1	.....	3
11	12	.....	.....	1	.....	3
12	13	.....	.....	1	.....	3
13	14	.....	.....	1	.....	3
14	15	.....	.....	.....	1	3
15	16	.....	.....	.....	1	3
16	.....	.....	.....	.....	1	3

Outside diameter, 8 inches. Each end tapped for 2½-inch pipe.

*If drums are to have SPECIAL Tappings, so specify on order.

MERCER BOILER

Steam or Water. Regular Tapping*

SUPPLY DRUM

No. 36 Mercer

Number of Tappings on Top of Drum

Number of Sections		Size of Tapping in inches					
Steam	Water	2½	3	3½	4	5	6
.....	7	1	.....	.....	3	.....	.....
7	8	1	.....	.....	3	.....	.....
8	9	.....	1	.....	3	.....	.....
9	10	.....	1	.....	2	1	.....
10	11	.....	1	.....	2	1	.....
11	12	.....	.....	1	2	.....	1
12	13	.....	.....	1	.....	2	1
13	14	.....	.....	1	.....	2	1
14	15	.....	.....	.....	1	.....	3
15	16	.....	.....	.....	1	.....	3
16	.....	.....	.....	.....	1	.....	3

Outside Diameter 10 inches. Each end tapped for 2½" Pipe.

RETURN DRUMS

No. 18 Mercer

Outside Diameter 4". Tapped for 1½" lock-nut nipples. Tapped 2½" each end.

Tapped 2" on top near end and 2" on underside near opposite end.

No. 27 Mercer

Outside Diameter 6". Tapped for 1½" lock-nut nipples. Tapped 2½" front end, 4" rear end.

Tapped 2" on top near end and 2" on underside near opposite end.

No. 36 Mercer

Outside Diameter 8". Tapped for 2" lock-nut nipples. Tapped 2½" front end.

7–8 hole drums, tapped 4" rear end.

9–10–11 hole drums, tapped 5" rear end.

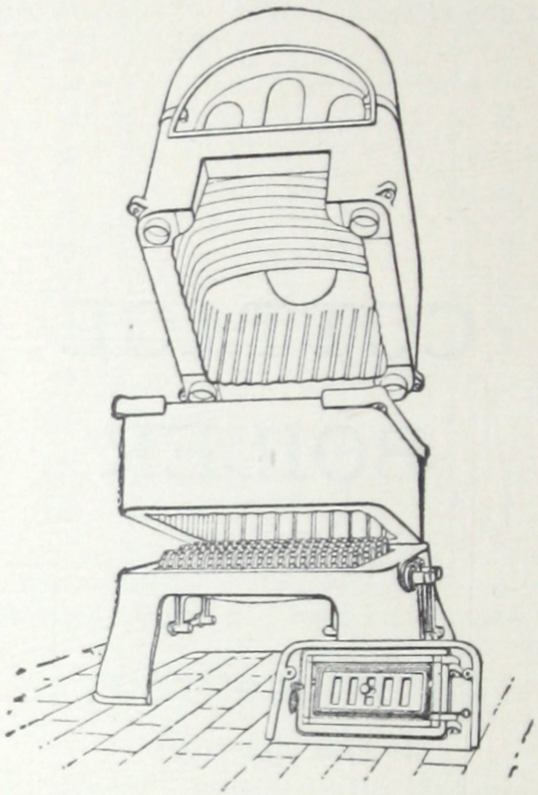
12–13–14–15–16 hole drums, tapped 6" rear end.

Tapped 2" on top near end and 2" on underside near opposite end.

* If drums are to have SPECIAL Tappings, so specify on order.

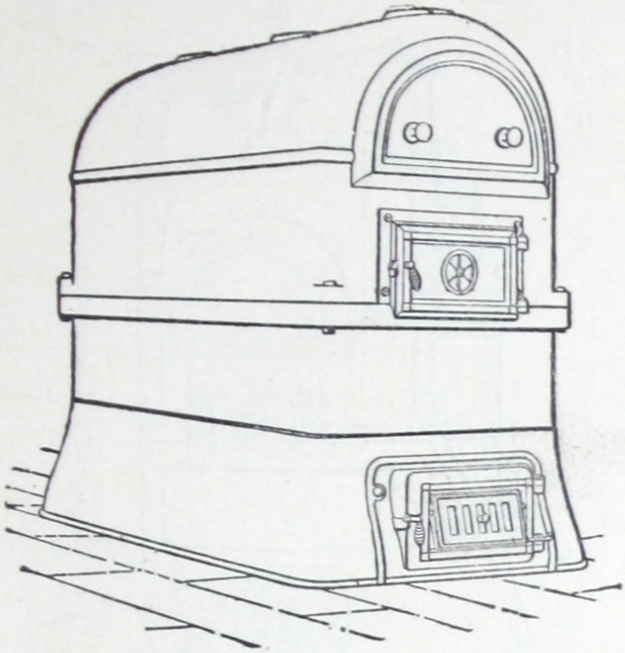
COTTAGE BOILER

COTTAGE BOILER



Interior

COTTAGE BOILER



Water

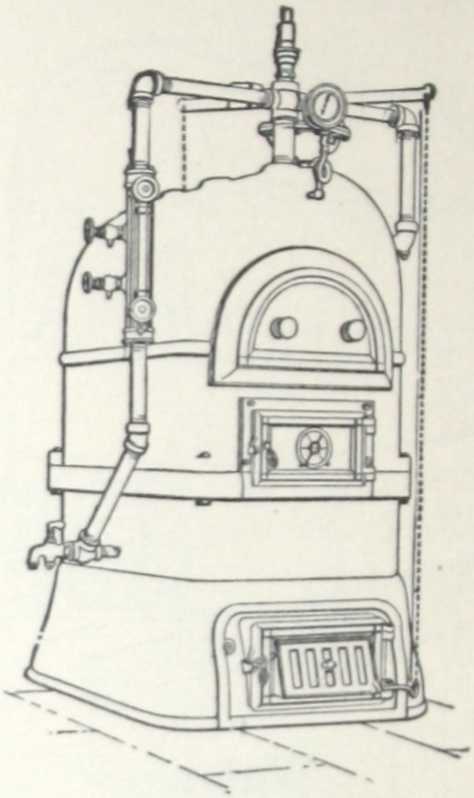
Water Ratings

No.	Size of Grate in inches	Area of Grate Sq. In.	Diam. of Equivalent Round Grate Inches	Rating* Sq. Ft.	Price†
00	12 x 12	144	13½	225	**$68**
0	12 x 16	192	15½	300	**79**
1	16 x 16	256	18	375	**92**
2	16 x 20	320	20	450	**107**
3	16 x 24	384	22	575	**129**
4	20 x 24	480	25	775	**170**
5	20 x 30	600	28	1000	**197**
6	20 x 36	720	30	1250	**254**

*See Page 4.

† The above prices are for the boiler complete together with fire tools, including flue brush (with handle), hoe, poker and shovel.

COTTAGE BOILER



Steam

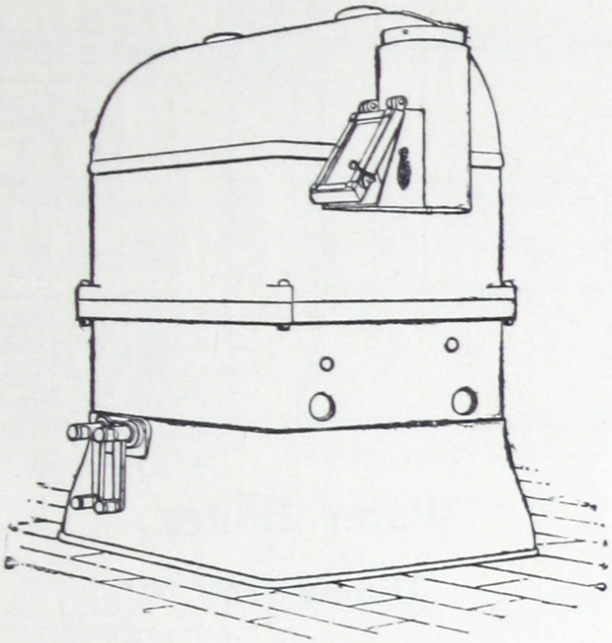
Steam Ratings

No.	Size of Grate in inches	Area of Grate Sq. In.	Diam. of Equivalent Round Grate Inches	Rating* Sq. Ft.	Price†
00	12 x 12	144	13½	135	$78
0	12 x 16	192	15½	175	89
1	16 x 16	256	18	225	102
2	16 x 20	320	20	275	117
3	16 x 24	384	22	350	139
4	20 x 24	480	25	475	180
5	20 x 30	600	28	600	207
6	20 x 36	720	30	750	264

*See Page 4.

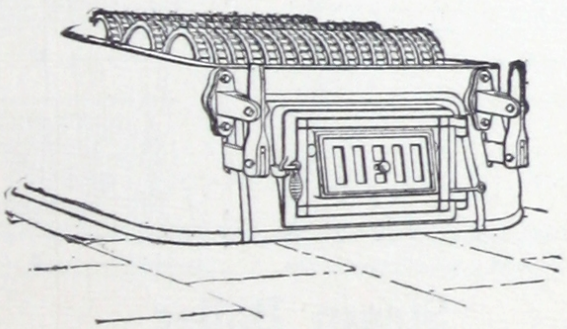
†The above prices are for boiler complete with trimmings and connections as shown, together with fire tools, including flue brush (with handle), poker and shovel.

COTTAGE BOILER



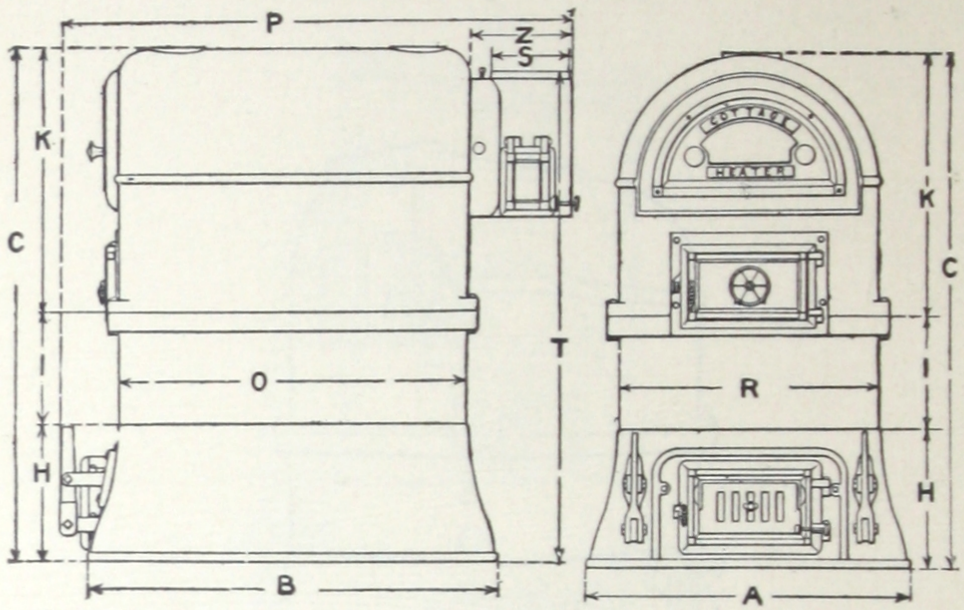
REAR

Showing Holes for Domestic Supply and Method of Shaking Nos. 00, 0, 1, 2 and 3 Boilers



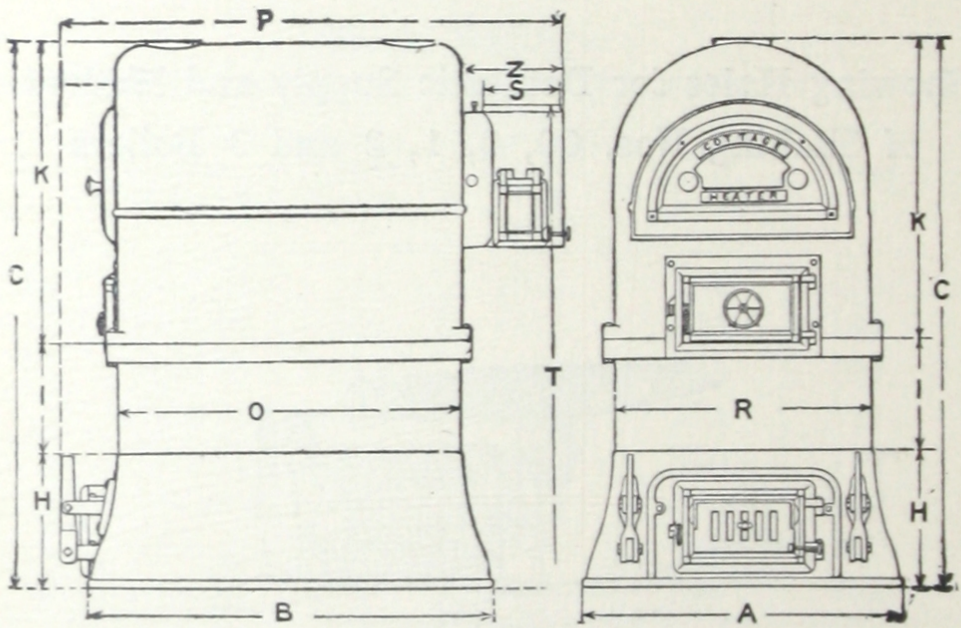
Method of Shaking Nos. 4, 5 and 6 Boilers only

COTTAGE BOILER



Water Boiler

Dimensions



Steam Boiler

Dimensions

COTTAGE BOILER

Dimensions in Inches

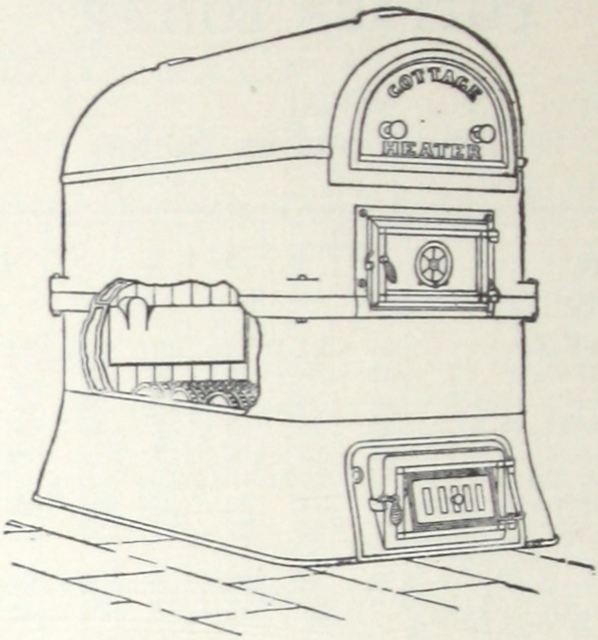
	Number	00	0	1	2	3	4	5	6
A	Width at floor . . .	24	24	28	28	28	32	32	32
B	Length at floor . . .	24	28	28	32	36	36	42	48
C	Total height, water .	44	44	45	45	45	49	49	49
C	Total height, steam .	44	44	49	49	49	54	54	54
H	Height of ash-pit . .	12	12	12	12	12	12	12	12
I*	Height of fire-pot . .	10¼	10¼	10¼	10¼	10¼	10¼	10¼	10¼
K*	Height of dome, water	21	21	23	23	23	26½	26½	26½
K*	Height of dome, steam	21	21	27	27	27	32	32	32
O	Length of boiler at fire-pot	18	22	22	26	30	30	36	44
P	Total length of boiler	27	31	31	35	39	39	45	51
R	Width of boiler at fire-pot	18	18	22	22	22	26	26	26
S	Diameter of smoke pipe	5¾	5¾	7	7	7	9	9	9
T	Height to top of smoke bonnet, water . .	48½	48½	52½	52½	52½	56	56	56
T	Height to top of smoke bonnet, steam . .	48½	48½	52½	52½	52½	54	54	54
Z	Length of smoke bonnet	7¾	7¾	8¾	8¾	8¾	10½	10½	10½
	Height of water line.	38	38	42	42	42	47	47	47

NOTE. — If bed plate is furnished with Cottage Boiler, the height of Boiler and height of water line will be increased accordingly.

Number	00	0	1	2	3	4	5	6
Height of Bed Plate in in.	3½	3½	3½	3½	3½	3¼	3¼	3¼
List Price of Bed Plate .	$7.00	$8.00	$11.50	$13.00	$14.00	$14.50	$16.50	$19.00

*Fire Pot (I) and Dome (K) are made in one casting on Nos. 00 and 0 Cottage Boilers.

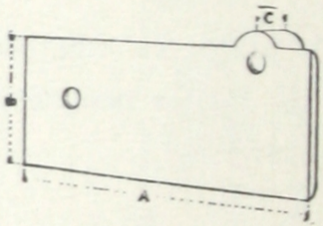
COTTAGE BOILER



Showing Water Back in Position

The fire pot on Cottage Boilers is cast with two holes in rear (see page 31) to admit ¾″ pipes to water back or water coil.

NOTE. — WATER BACKS are not shipped unless specified on order, in which case an extra charge is made.



Water Back

Dimensions

NUMBER	A	B	C	Price
For Nos. 1, 2 and 3 Boilers	15½″	6″	1″	$3.50
For Nos. 4, 5 and 6 Boilers	18½″	6″	1″	4.00

Two Tappings, each ¾″

COTTAGE BOILER

For Greenhouse

Heated by Cast Iron Pipe

Hub

Price, all sizes, $2.00

The Greenhouse Boiler is the same as the regular Cottage Water Boiler with the addition of special fittings called Hubs. These fittings are made to screw into the regular tappings of the boiler (or into wrought iron pipe connected with the boiler), and have hubs to receive cast iron pipe.

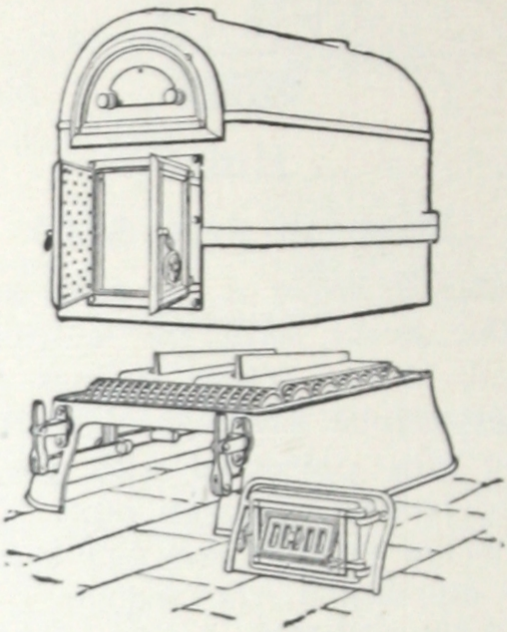
In places where wrought iron pipe is to be used for making the circulation, the regular Cottage Water Boiler should be specified.

Cottage Greenhouse Boiler				Hubs	
No.	Size of Grate in Inches	Grate Surface Sq. In.	Sq. Ft. of Glass Warmed	Size of Wrought Iron Pipe	Size of Cast Iron Pipe
00	12 x 12	144	600	4″	4″
0	12 x 16	192	800	3″	4″
1	16 x 16	256	1000	2½″	4″
2	16 x 20	320	1300	2″	4″
3	16 x 24	384	1600	3″	3″
4	20 x 24	480	2000	2½″	3″
5	20 x 30	600	2400	2″	3″
6	20 x 36	720	3200	2″	2″

Specify on order the number and size of hubs required.

COTTAGE BOILER

For Burning Wood



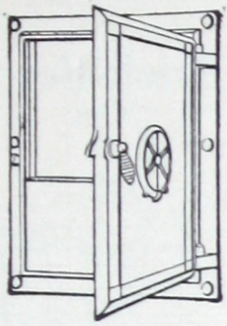
Steam or Water

These boilers are the same as the regular **water and steam boilers** (see pages 20 and 21), with the exception of large **fire doors** and **grate covers.**

Wood-burning boilers can be used for burning coal, as the regular grate is furnished with complete shaking apparatus, which must be placed in position.

NOTE. — Nos. 00 and 0 boilers are the same as the regular water and steam boilers with the addition of grate covers.

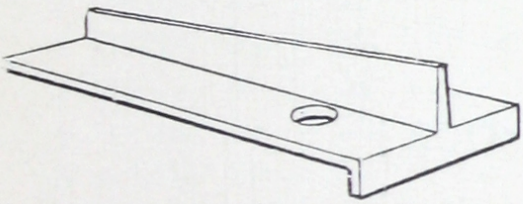
COTTAGE BOILER
For Burning Wood



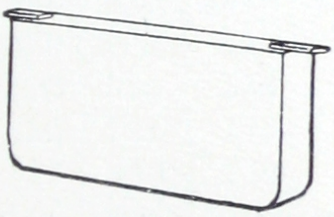
FIRE DOOR

Cast Iron Brick in Position

No.	Size of Grate in inches	Size of Fire Doors in inches	Price of Boiler Complete, F.O.B. Factory	
			Water	Steam
00	12 x 12	5½ x 9	$70	$80
0	12 x 16	5½ x 9	82	92
1	16 x 16	10¾ x 11¼	98	108
2	16 x 20	10¾ x 11¼	114	124
3	16 x 24	10¾ x 11¼	138	148
4	20 x 24	12 x 14	182	192
5	20 x 30	12 x 14	212	222
6	20 x 36	12 x 14	270	280



GRATE COVER



CAST IRON BRICK

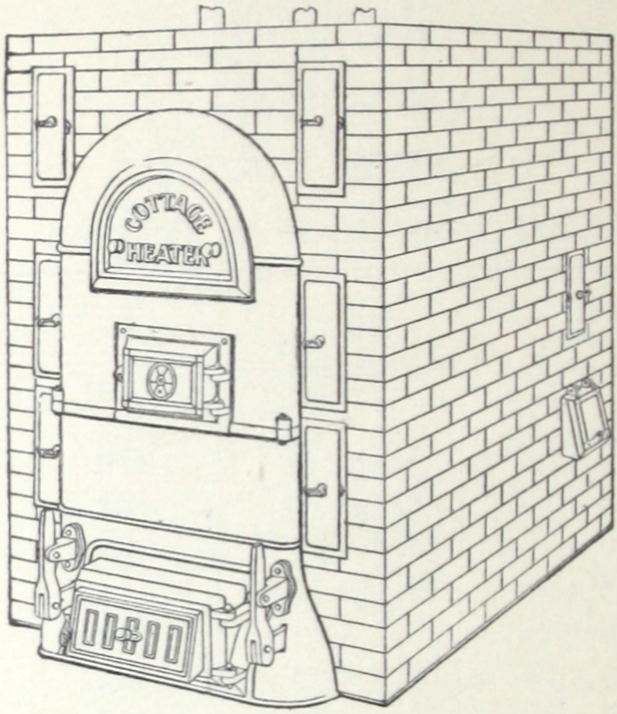
Grate covers are furnished to be placed upon the grate, thus adapting it for wood burning.

When wood burning boilers are to be used for burning coal, a cast iron brick is furnished to be placed in the fire door opening, thus increasing the depth of the fire pot.

Not carried in Stock

COTTAGE BOILER

Brick-Set



Method of Shaking Nos. 4, 5 and 6 Boilers only

NOTICE

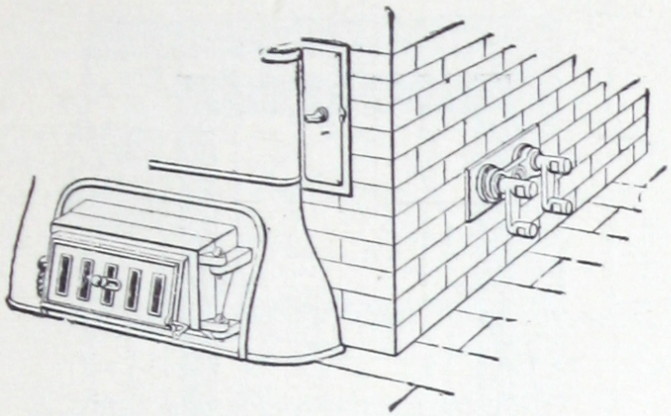
Brick-set Cottage Boilers are furnished with clean-out doors and covering bars, as per following illustrations.

Back bonnet is not required and therefore not furnished.

The following trimmings only are furnished with Cottage Brick-set Boilers for **steam** warming: water column complete, hose bib, steam cock, diaphragm complete, pop valve, steam gauge, and jack chain.

COTTAGE BOILER

Brick-Set



Method of Shaking Nos. 1, 2 and 3 Boilers only

Dimensions in Inches

(See Pages 40 and 41)

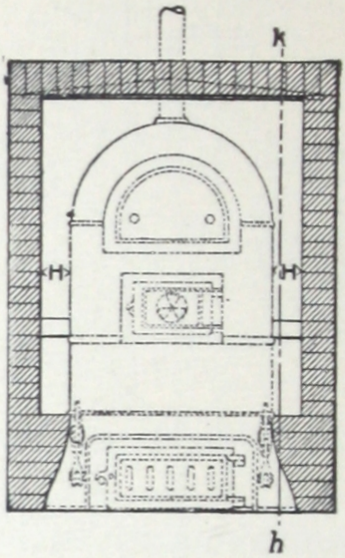
No.	A	B	C		K	L	N	No. of Bricks		Price	
			Steam	Water				Steam	Water	Steam	Water
1	38	35	59	52	6	7	19	625	550	$115	$105
2	38	39	59	52	6	7	19	675	600	130	120
3	38	43	59	52	8	7	19	725	650	154	144
4	42	43	69	56	8	9	23	850	725	192	182
5	42	49	69	56	10	9	23	925	850	219	209
6	42	55	69	56	10	9	23	1000	925	278	268

D	8″	H	4″
E	4″	I	3½″
F	4″	J	11″
G	8″	M	6″

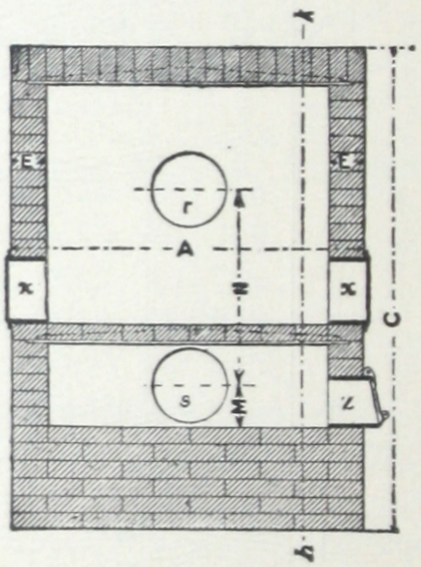
For sizes of Grate, etc., see page 29.

COTTAGE BOILER

Brick-Set



Section on a b

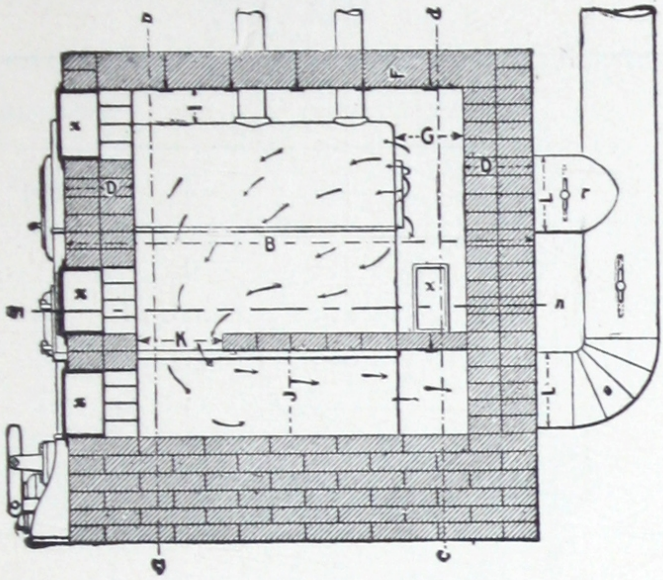


Section on c d

r = Smoke pipe (direct draft)
s = Smoke pipe (indirect draft)
x = Clean-out
z = Check Draft

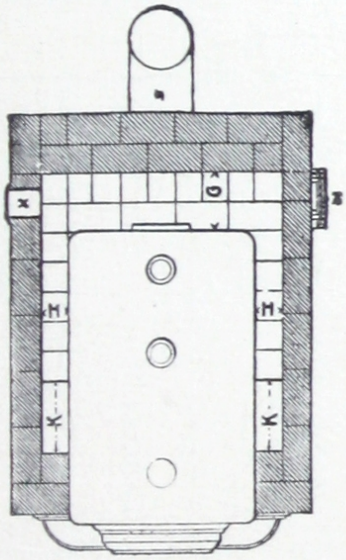
COTTAGE BOILER

Brick-Set



Section on h k

Showing direction of (indirect) draft.



Section on m n

r = Smoke pipe (direct draft)
s = Smoke pipe (indirect draft)
x = Clean-out
z = Check Draft

COTTAGE BOILER

Regular Tapping*

WATER

No.	Supply			Return		
	2″	2½″	3″	2″	2½″	3″
00	2	.....	.....	1	.....	.....
0	1	1	.....	.....	1	.....
1	1	1	.....	.....	1	.....
2	.....	2	.....	.....	2	.....
3	.....	2	.....	.....	2	.....
4	.....	2	.....	.....	2	.....
5	.....	.....	2	.....	.....	2
6	.....	2	1	.....	.....	2

STEAM

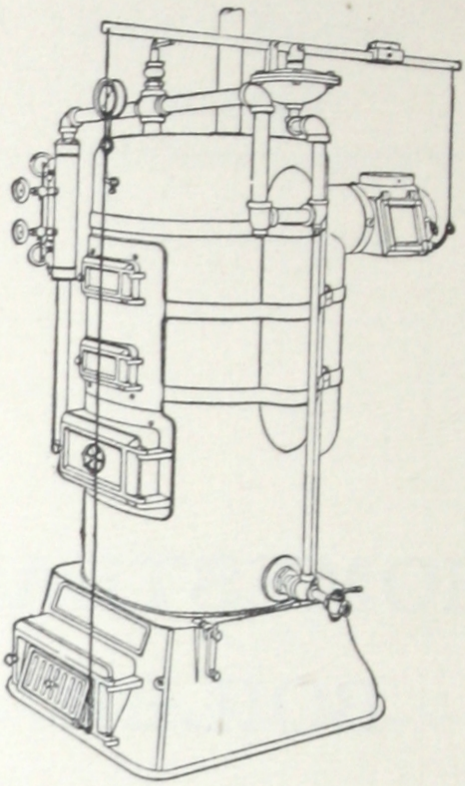
No.	Supply †				Return		
	1¼″	2″	2½″	3″	1½″	2″	2½″
00	.....	1	.....	.....	.....	1	.....
0	.....	.....	1	.....	.....	.....	1
1	1	1	.....	.....	1	.....	.....
2	1	.....	1	.....	.....	1	.....
3	.....	1	1	.....	.....	1	.....
4	.....	1	.....	1	.....	.....	1
5	.....	1	.....	1	.....	.....	1
6	.....	1	.....	1	.....	.....	1

* If boiler is to have Special tappings, so specify on order.

† In addition to the above tappings, on top of Steam Boilers there is one 1¼″ tapping on Nos. 00, 1, 2, 3 and 4 Boilers; one 1½″ tapping on No. 5 Boiler, and one 2″ tapping on No. 6 Boiler. These extra tappings are to be used for steam trimmings.

HOMESTEAD
BOILER

HOMESTEAD BOILER



Number 118 Steam

One Intermediate Section.
Grate 18 inches, Round

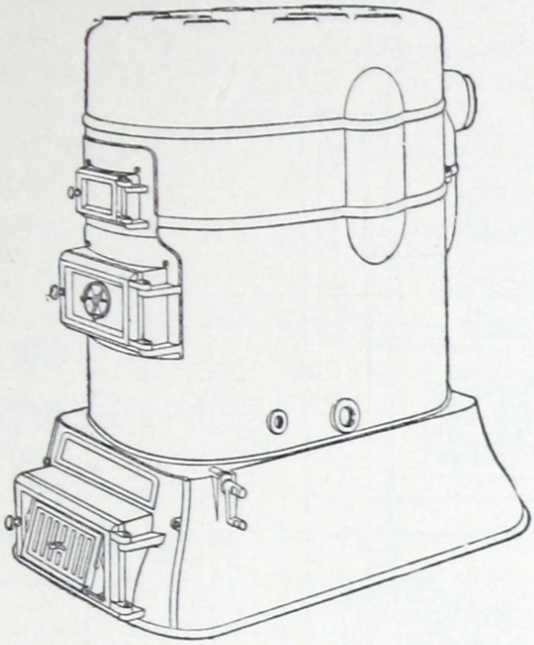
Steam Ratings

No.	Size of Grate in Inches	Area of Grate Sq. In.	Rating* Sq. Ft.	Price †
18	18 Diameter	254	300	$124
118	18 Diameter	254	335	135
27	18 x 27 Elliptical	416	470	179
127	18 x 27 Elliptical	416	540	194
36	18 x 36 Elliptical	578	730	259
136	18 x 36 Elliptical	578	800	276

*See Page 4.

† The above prices are for the boiler complete, with trimmings and connections as shown, together with fire tools, including flue brush (with handle), hoe, poker and shovel.

HOMESTEAD BOILER



Number 36 Water

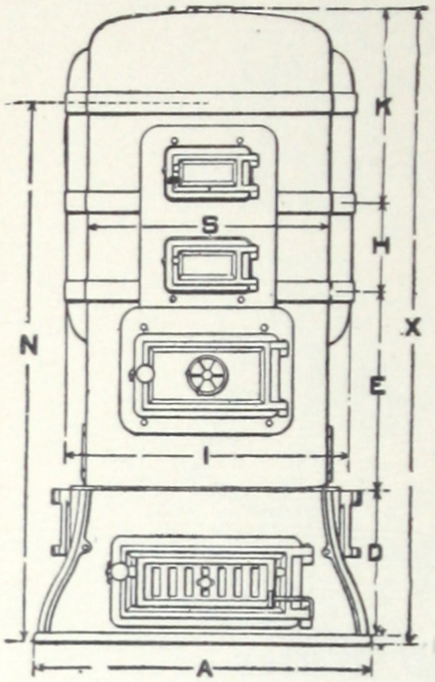
No Intermediate Section.
Grate 18 x 36 inches, Elliptical

Water Ratings

No.	Size of Grate in Inches	Area of Grate Sq. In.	Rating* Sq. Ft.	Price
18	18 Diameter	254	500	$114
118	18 Diameter	254	550	125
27	18 x 27 Elliptical	416	775	169
127	18 x 27 Elliptical	416	900	184
36	18 x 36 Elliptical	578	1200	249
136	18 x 36 Elliptical	578	1325	266

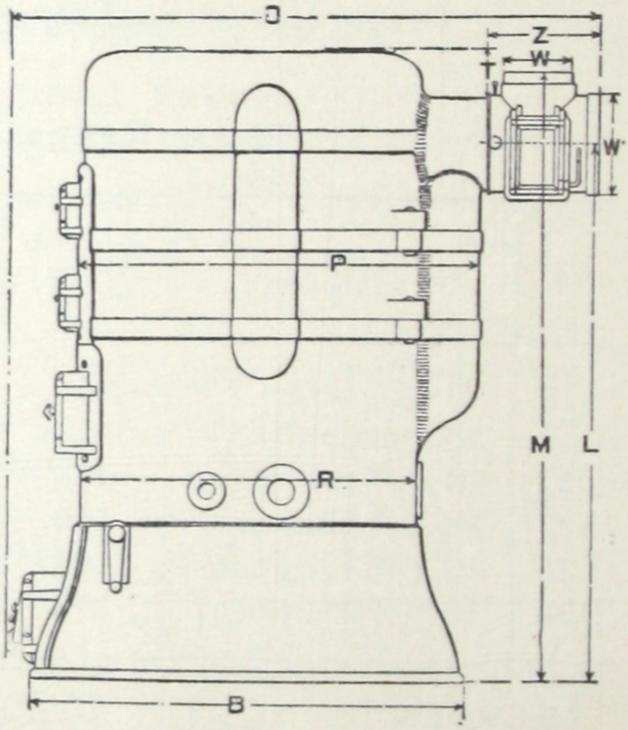
*See Page 4.

HOMESTEAD BOILER



FRONT ELEVATION

SIDE ELEVATION



HOMESTEAD BOILER

Dimensions in Inches

	Number of Boiler	18 118	27 127	36 136
A	Width at floor	32	32	32
B	Length at floor	32	41	50
D	Height of ash-pit	12	12	12
E	Height of fire-pot	21	21	21
H	Height of intermediate section	8	8	8
I	Total width of section	30	30	30
K	Height of dome section	16½	16½	16½
O	Total length	46	55	64
P	Total length of section	29½	38½	47½
R	Outside long diameter of fire-pot	23¾	32¾	41¾
S	Width of section, excluding bosses	24	24	24
T	Distance from top of smoke-flange to top of boiler	4¾	3¾	3¾
W	Diameter of smoke-pipe	7	8	9
Z	Length of smoke bonnet	10	11	13

	Number of Boiler	18 27 36	118 127 136
L	Distance from floor to center of side smoke pipe	41	49
M	Distance from floor to top of smoke bonnet*	47½	55½
N	Height of water line	41	49
X	Total height	49	57

* Excepting in { No. 18 Homestead, 46 inches. / No. 118 Homestead, 54 inches.

Note. — If bed plate is furnished with Homestead Boiler, the height of Boiler and height of water line will be increased ½ inch.

Bed Plate

Number	18	118	27	127	36	136
List Price	$7.50	$7.50	$12.00	$12.00	$13.00	$13.00

HOMESTEAD BOILER

Regular Tapping

Steam

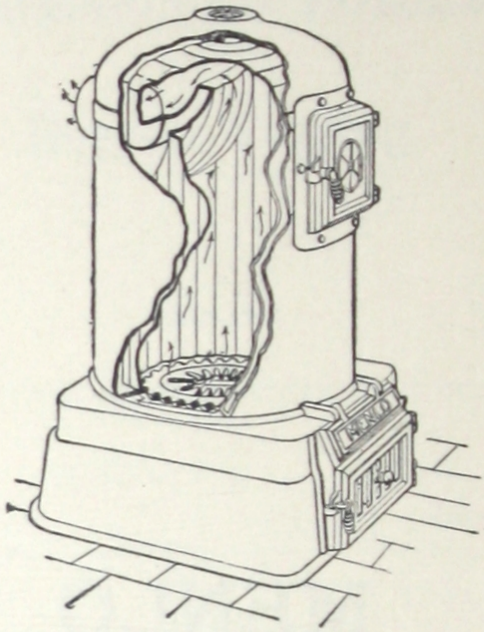
Number	Supply on Top	Return	
		Rear	Sides
18, 118	2–2″	1–2½″	
27, 127	1–2½″, 2–2″	1–3″	2–2″
36, 136	1–3″, 2–2″	1–4″	2–2½″

Water

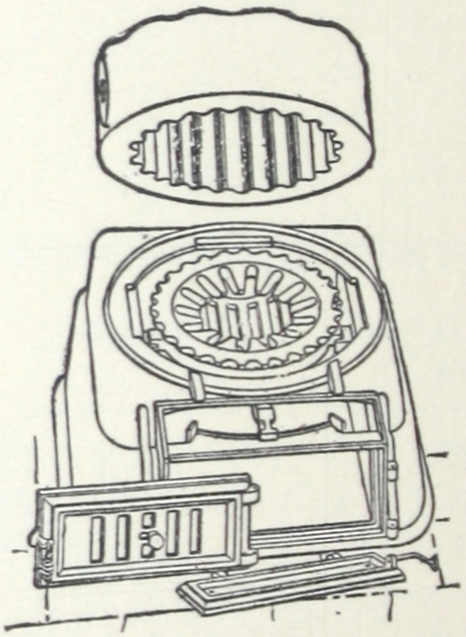
Number	Supply on Top	Return	
		Rear	Sides
18, 118	1–2½″, 2–2″	1–2½″	
27, 127	1–3″, 2–2″	1–3″	2–2″
36, 136	1–4″, 2–2″	1–4″	2–2½″

MENLO
BOILER

MENLO BOILER



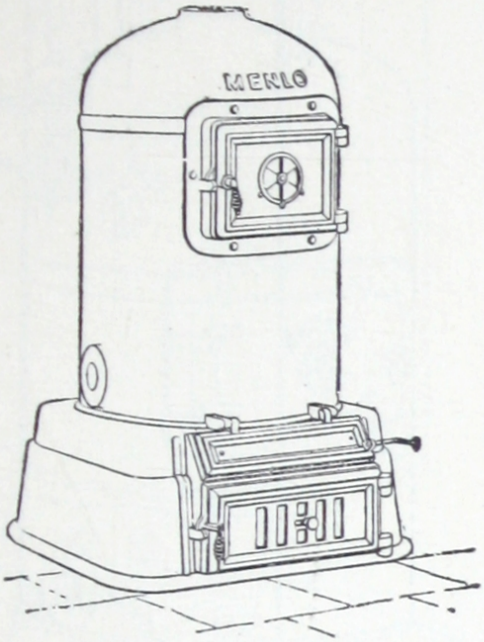
Nos. 10, 12 and 14 Menlo
Showing Fire Travel



ASH PIT

Nos. 10, 12 and 14 Menlo
Showing Grates with Method of Shaking and Dumping

MENLO BOILER



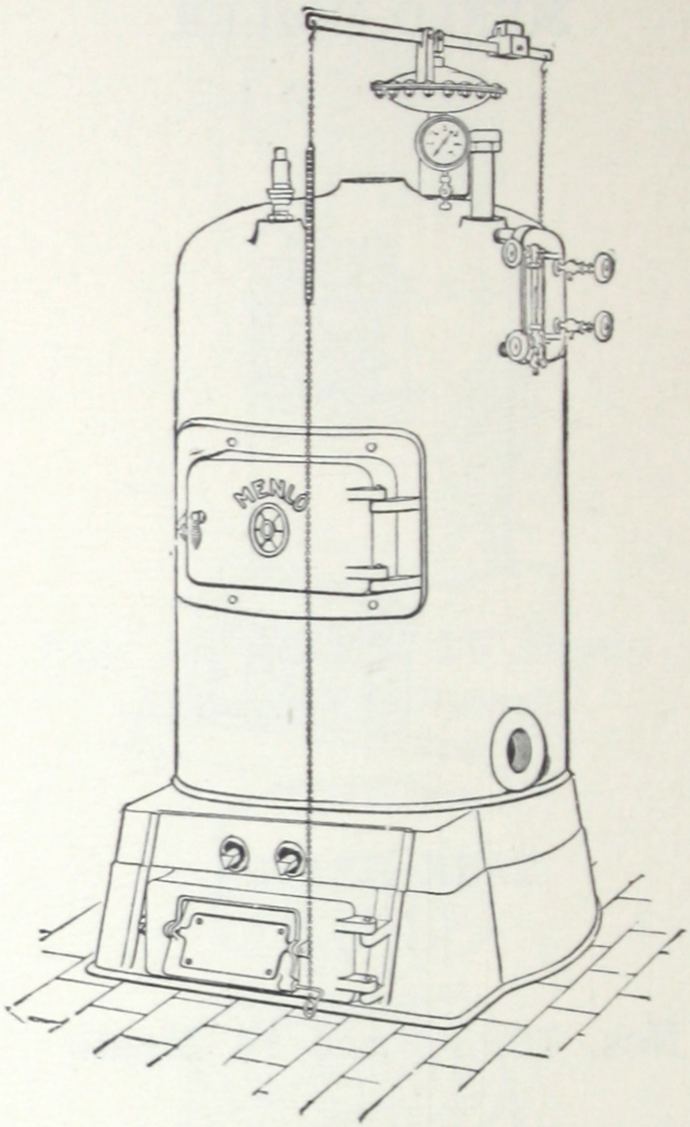
TANK HEATER

Nos. 10, 12 and 14 Menlo

Rating

No.	Diameter of Grate in Inches	Tank Capacity in Gallons	Price
10	10	225	$40
12	12	350	50
14	14	500	70
16	16	750	107
18	18	1100	129
20	20	1500	164

MENLO BOILER



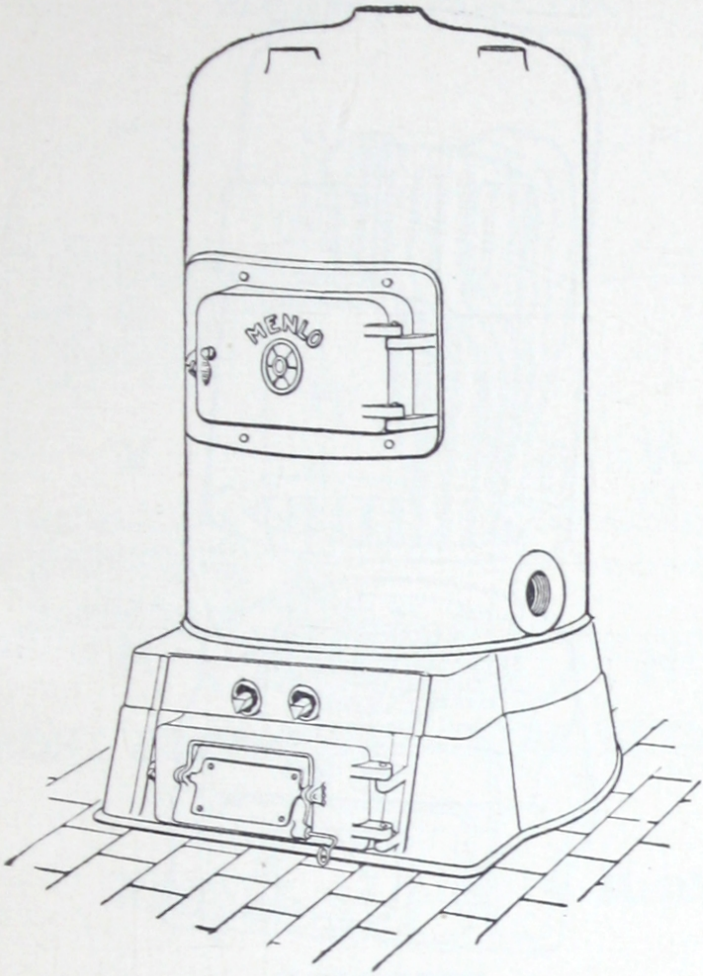
Nos. 16, 18 and 20 Menlo

Steam Rating

No.	Diameter of Grate in Inches	Rating* Sq. Ft.	Price
16	16	275	**$117**
18	18	350	**139**
20	20	450	**174**

* See Page 4.

MENLO BOILER



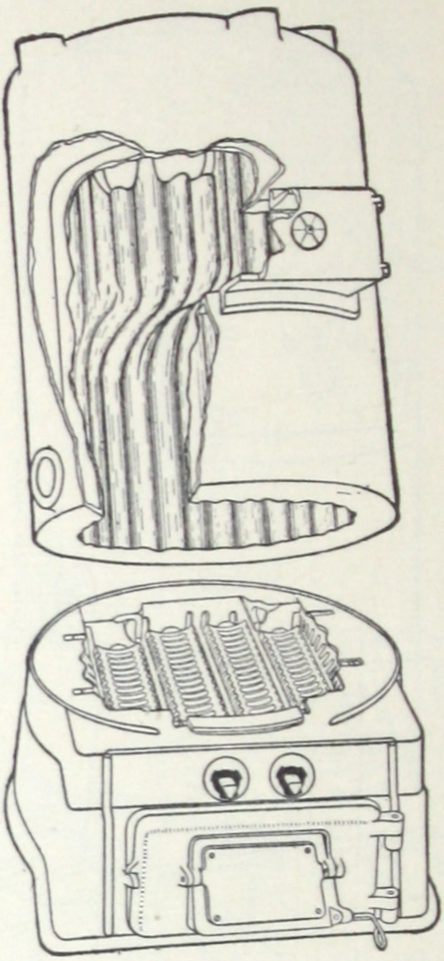
Nos. 16, 18 and 20 Menlo

Water Rating

No.	Diameter of Grate in Inches	Rating* Sq. Ft.	Price
10	10	165	**$40**
12	12	250	**50**
14	14	325	**70**
16	16	450	**107**
18	18	575	**129**
20	20	750	**164**

* See Page 4.

MENLO BOILER



INTERIOR

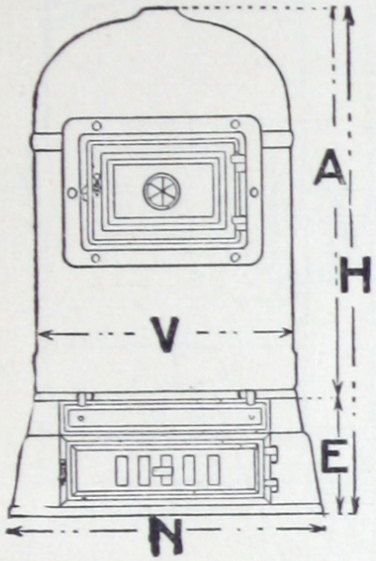
Nos. 16, 18 and 20 Menlo

Regular Tapping *

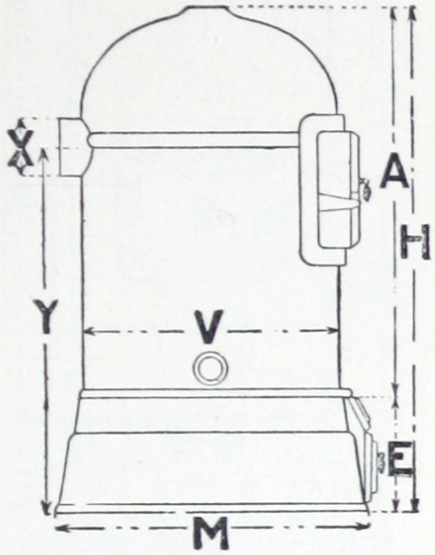
No.	Supply	Return
10	1–2″	2–2″
12	1–2″	2–2″
14	1–2½″	2–2″
16	1–3″, 2–1½″	1–3″, 2–2″
18	1–3″, 2–1½″	1–3″, 2–2″
20	1–3″, 2–1½″	1–3″, 2–2″

* If boiler is to have SPECIAL tappings, so specify on order.

MENLO BOILER



FRONT ELEVATION



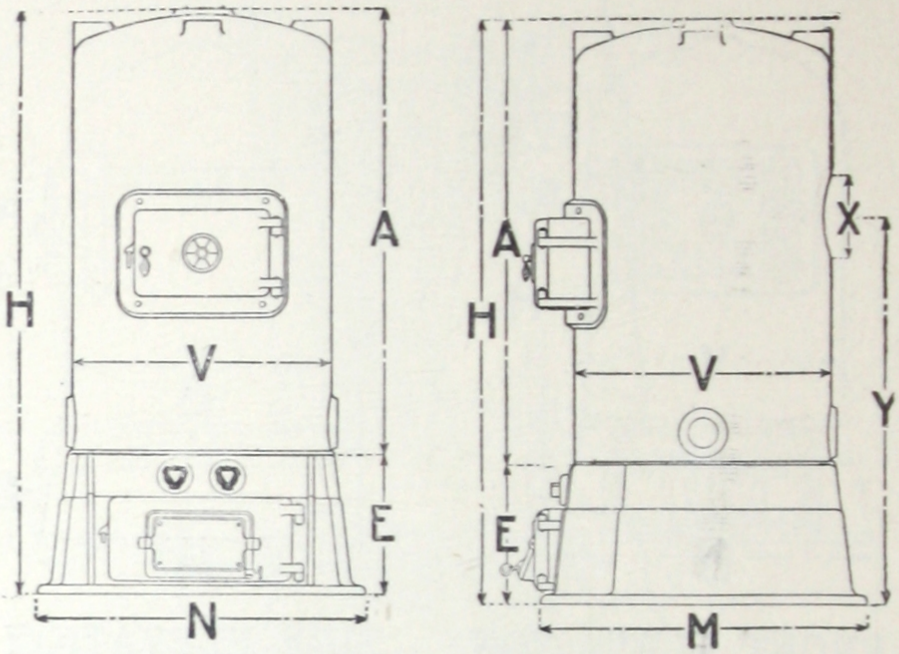
SIDE ELEVATION

Nos. 10, 12 and 14 Menlo

Dimensions in Inches

	Dimension	No. 10	No. 12	No. 14
A	Height of dome	24	25½	27
E	Height of ash pit	8	8	8
H	Total height	32	33½	35
M	Length at floor	19½	22	24½
N	Width at floor	19½	22	24½
V	Diameter of dome	15	17½	20
X	Diameter of smoke pipe	5	5	6
Y	Height to center of smoke pipe	25	26	29½

MENLO BOILER



FRONT ELEVATION SIDE ELEVATION

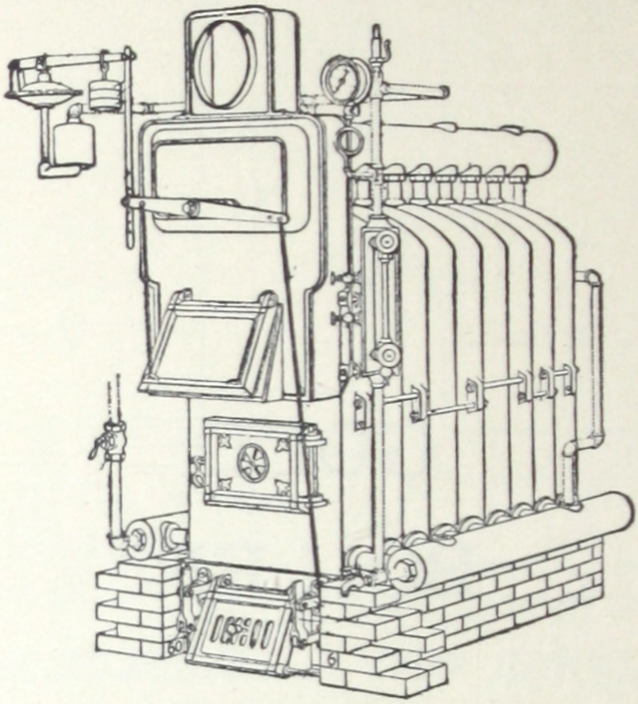
Nos. 16, 18 and 20 Menlo

Dimensions in Inches

	Dimension	No. 16	No. 18	No. 20
A	Height of dome	38	38	39
E	Height of ash pit	12½	12½	12½
H	Total height	50½	50½	51½
M	Length at floor	27¼	29¼	31¼
N	Width at floor	27¾	29¾	31¾
V	Diameter of dome	22	24	26
X	Diameter of smoke pipe	7	7	8
Y	Height to center of smoke pipe	33¼	33¼	33¼

GOLD
BOILER

GOLD BOILER



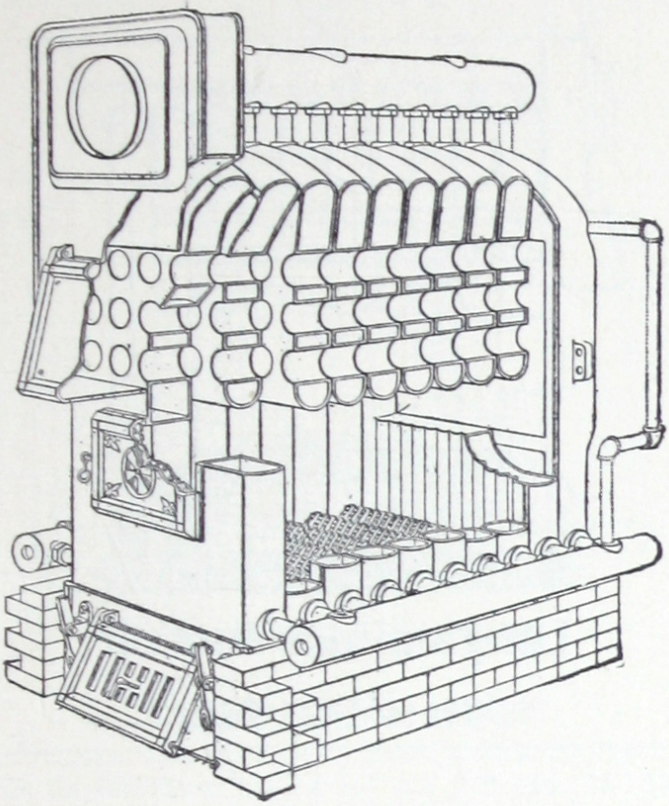
No. 1 Boiler

Sections	Size of Grate in Inches	Rating* Direct Radiation Sq. Ft.	Rating† Indirect Radiation Sq. Ft.	Price
6	18 x 18	400	300	$161
7	18 x 24	500	375	207
8	18 x 30	600	450	233
9	18 x 36	750	550	270
10	18 x 42	875	650	302
11	18 x 48	975	725	326
12	18 x 48	1075	800	350

* See Page 4.

† Based on the radiators being placed in the main chamber.

GOLD BOILER



No. 2 Boiler

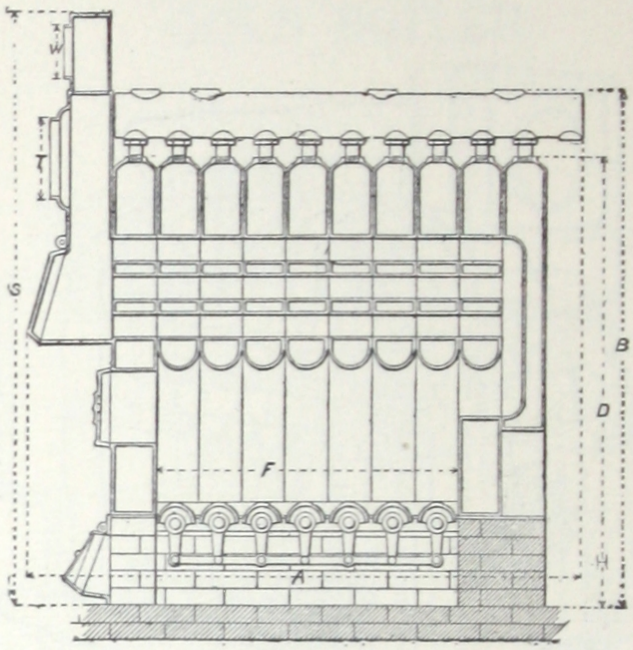
Showing Interior

Sections	Size of Grate in Inches	Rating* Direct Radiation Sq. Ft.	Rating† Indirect Radiation Sq. Ft.	Price
8	24 x 30	875	650	$302
9	24 x 36	1000	750	333
10	24 x 42	1150	850	370
11	24 x 48	1350	1000	420
12	24 x 54	1550	1150	470
13	24 x 60	1750	1300	520
14	24 x 60	1900	1450	557

*See Page 4.

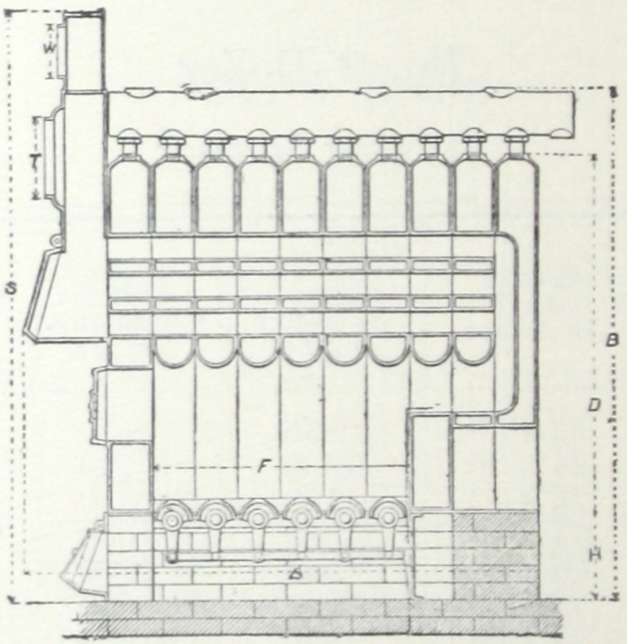
†Based on the radiators being placed in the main chamber.

GOLD BOILER



Longitudinal Section

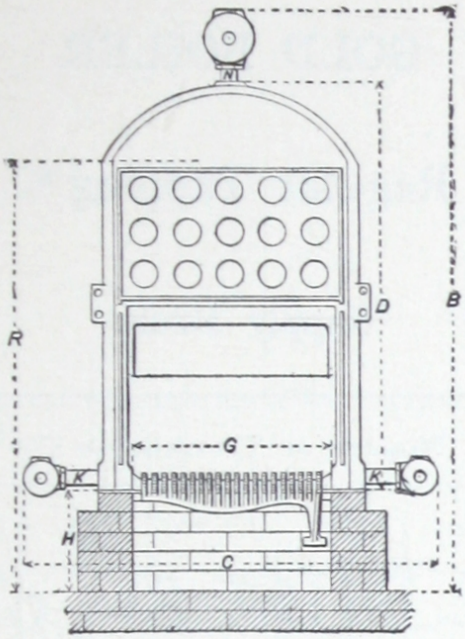
Grate Full Size



Longitudinal Section

Grate Reduced 6 Inches

GOLD BOILER



Transverse Section

Dimensions in Inches

	Number of Sections	6	7	8	9	10	11	12	13	14
A	Total length, No. 1 Boiler.	50	56	62	68	74	80	86	...	....
A	Total length, No. 2 Boiler.	...	...	66	72	78	84	90	96	102
F	Length of fire-pot (full size), No. 1 Boiler . .	18	24	30	36	42	48	54	...	....
F	Length of fire-pot (full size), No. 2 Boiler . . .	...	...	30	36	42	48	54	60	60

	Dimension	No. 1	No. 2
B	Total height . .	66	72
C	Total width . .	45	51
D	Height of section	45	51
G	Width of fire-pot	18	24
H	Height of foundation	12½	12½
K	Size of return nipple	1¼	1¼

	Dimension	No. 1	No. 2
N	Size of supply nipple . . .	1¼	1¼
R	Height of water line	48	54
S	Height to top of smoke bonnet extension* . .	78	.....
T	Diameter of smoke pipe .	.....	11¾
W	Diameter of smoke pipe .	9½	.....

Smoke bonnet extension is not furnished with No. 2 Boiler unless specified on order.

*This measurement is given for No. 1 Gold Boiler with 12 inch Extension Bonnet.

GOLD BOILER

Regular Tapping *

Supply Drum

Sections	Number of Tappings on Top of Drum					
	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.
6	1	.....	.....	2	.....	.....
7	.....	1	.....	2	1	.....
8	.....	1	.....	2	1	.....
9	.....	.....	1	2	1	.....
10	.....	.....	1	2	1	.....
11	.....	.....	.....	3	.....	1
12	.....	.....	.....	3	.....	1
13	.....	.....	.....	2	1	1
14	.....	.....	.....	2	1	1

Outside diameter, 6″.

Supply drum tapped for 2″ pipe in rear

Rear end tapped for 2″ pipe.

Return Drum

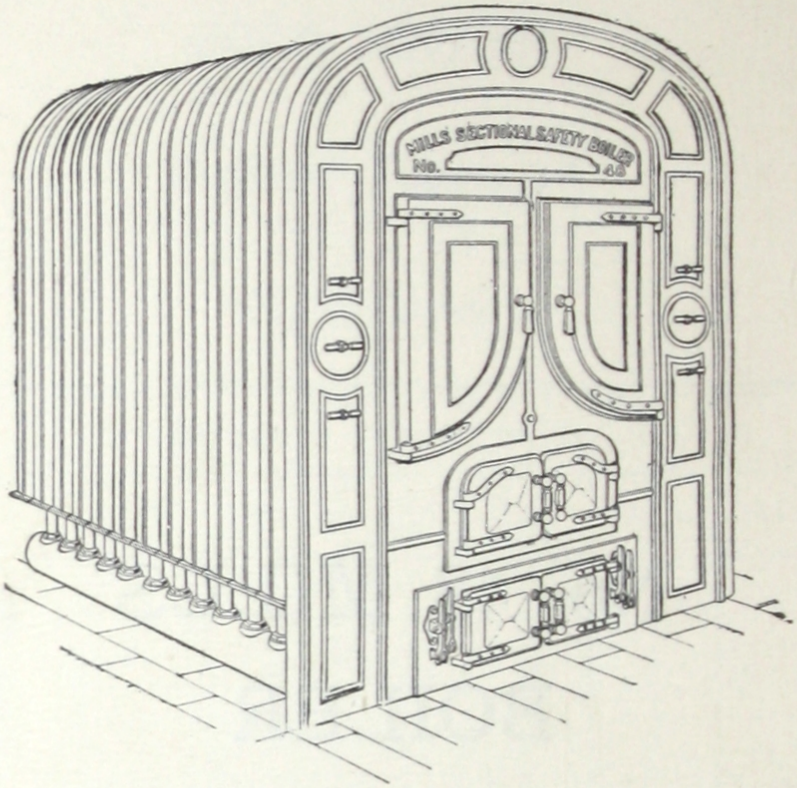
Outside diameter, 4½″.

Return drums are tapped for two 1¼″ pipes on top and for 1½″ pipe on each end.

* If boiler is to have Special tappings, so specify on order.

No. 48 MILLS BOILER

No. 48 MILLS BOILER

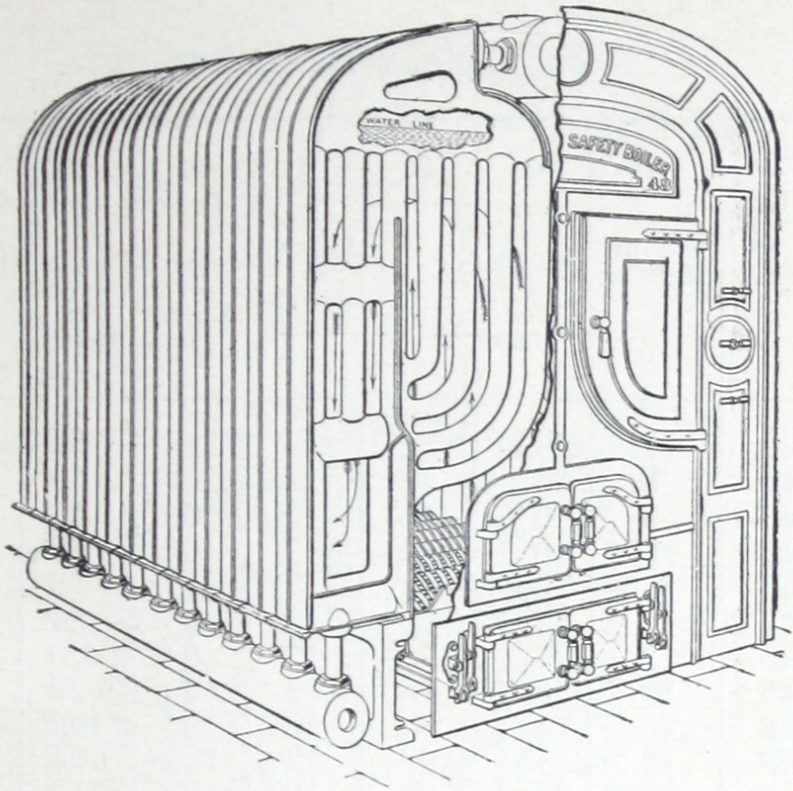


Steam Ratings

No.	Size of Grate in Inches	Grate Surface Sq. Ft.	Fire Surface Sq. Ft.	Ratings* Sq. Ft.	Price
748	48 x 30	10	360	4800	$1085
848	48 x 36	12	420	5600	1219
948	48 x 42	14	480	6400	1352
1048	48 x 48	16	540	7200	1485
1148	48 x 54	18	600	8000	1619
1248	48 x 60	20	660	8800	1752
1348	48 x 66	22	720	9600	1885
1448	48 x 72	24	780	10400	2019
1548	48 x 78	26	840	11200	2152
1648	48 x 84	28	900	12000	2285
1748	48 x 72	24	960	12800	2419
1848	48 x 78	26	1020	13600	2552
1948	48 x 84	28	1080	14400	2685
2048	48 x 84	28	1140	15200	2819

*See Page 4.

No. 48 MILLS BOILER



Water Ratings

No.	Size of Grate in inches	Grate Surface Sq. Ft.	Fire Surface Sq. Ft.	Ratings* Sq. Ft.	Price
748	48 x 30	10	360	7925	**$1035**
848	48 x 36	12	420	9250	**1169**
948	48 x 42	14	480	10550	**1302**
1048	48 x 48	16	540	11875	**1435**
1148	48 x 54	18	600	13200	**1569**
1248	48 x 60	20	660	14525	**1702**
1348	48 x 66	22	720	15850	**1835**
1448	48 x 72	24	780	17150	**1969**
1548	48 x 78	26	840	18475	**2102**
1648	48 x 84	28	900	19800	**2235**
1748	48 x 72	24	960	21125	**2369**
1848	48 x 78	26	1020	22450	**2502**
1948	48 x 84	28	1080	23750	**2635**
2048	48 x 84	28	1140	25075	**2769**

*See Page 4.

No. 48 MILLS BOILER

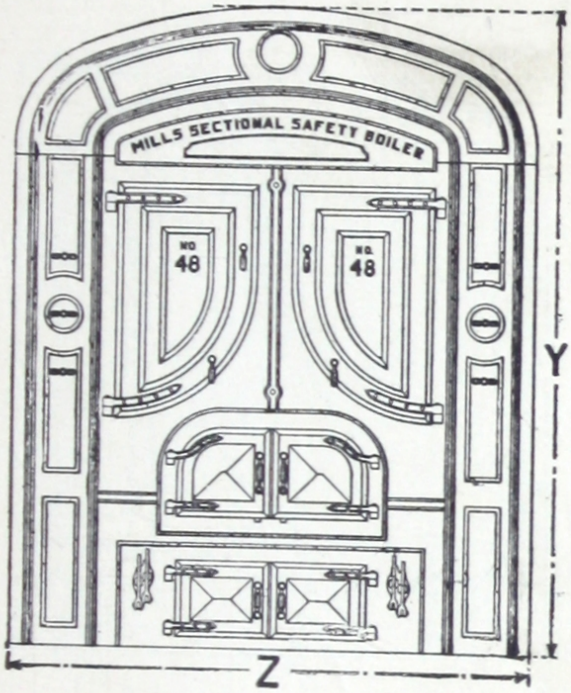
Dimensions in Inches

No. of Boiler	No. of Sections	C	F	J	K	P	U
		Width of Smoke Flange	Length of Ash Pit	Length of Smoke Chamber	Length of Foundation	Total Length of Boiler	Length of Fire Pot
748	7	16	36	12	48	54	30
848	8	16	42	12	54	60	36
948	9	16	48	12	60	66	42
1048	10	16	54	12	66	72	48
1148	11	23¾	60	12	72	78	54
1248	12	23¾	66	12	78	84	60
1348	13	23¾	72	12	84	90	66
1448	14	23¾	78	12	90	96	72
1548	15	23¾	84	12	96	102	78
1648	16	31½	90	12	102	108	84
1748	17	31½	84	18	102	114	78
1848	18	31½	90	18	108	120	84
1948	19	31½	90	24	114	126	84
2048	20	31½	90	30	120	132	84

A	Width of ash pit	60″
d	Height of smoke flange	16″
L	Width of section	82½″
N	Width of fire-pot	48″
O	Height of water line	84″
R	Height of section	83¼″
S	Height of boiler	102½″
T	Height of ash pit	18″
W	Size of supply drum nipple	2″ x 6″
X	Size of return drum nipple	2″ x 9″
x	Distance between centers of grate bars	6″
Y	Height of boiler front	103¼″
Z	Width of Boiler front	84″

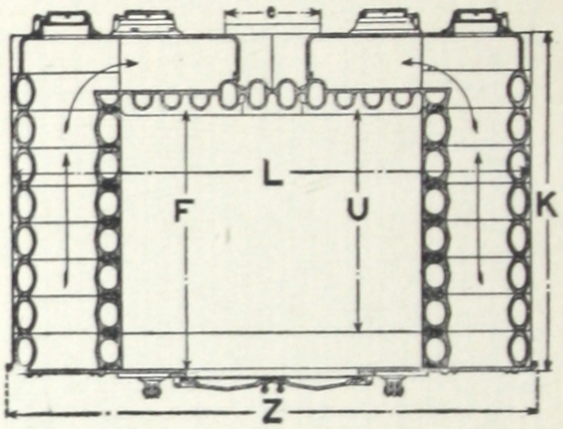
(See following pages.)

No. 48 MILLS BOILER



Front

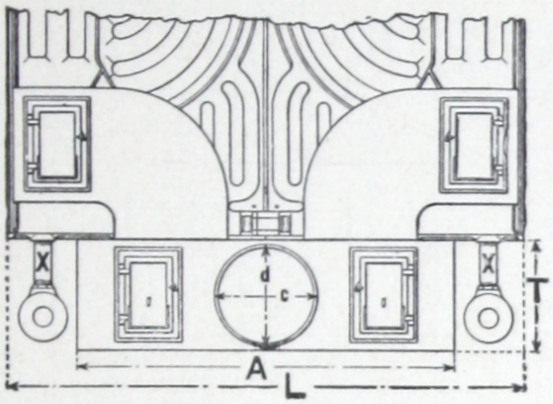
No. 48 MILLS BOILER



Plan, Section on bb

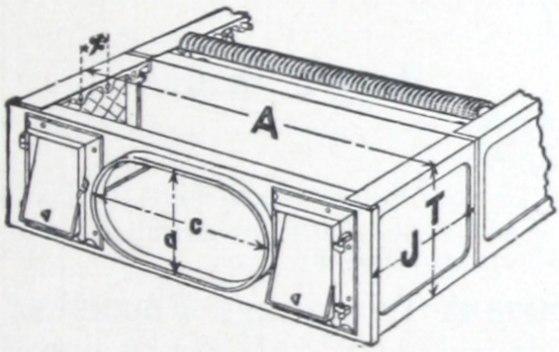
Grate Full Size, Smoke Bonnets Used

No. 48 MILLS BOILER



Rear of Boiler

Grate Full Size, Showing Smoke Bonnets



Rear of Foundation

Grate Reduced 12 Inches

Dimension	d	c	Equivalent
Smoke Flange...	16″ x 16″		= 16″ Round = 201 sq. in.
Smoke Flange...	16″ x 23¾″		= 20″ Round = 314 "
Smoke Flange...	16″ x 31½″		= 24″ Round = 452 "

No. 48 MILLS BOILER

Regular Tapping for Steam Boiler *

Number of Tappings on Top of Supply Drum

No. of Boiler	Size of Tapping					
	2½ In.	3 In.	3½ In.	4 In.	6 In.	8 In.
748	1	1	.....	.....	2	.....
848	1	1	.....	.....	2	.....
948	.....	2	.....	.....	1	1
1048	.....	2	.....	.....	1	1
1148	.....	.....	2	.....	.....	2
1248	.....	.....	2	.....	.....	2
1348	.....	.....	2	.....	.....	2
1448	.....	.....	.....	2	.....	2
1548	.....	.....	.....	2	.....	2
1648	.....	.....	.....	2	.....	2
1748	.....	.....	.....	2	.....	2
1848	.....	.....	.....	2	.....	2
1948	.....	.....	.....	2	.....	2
2048	.....	.....	.....	2	.....	2

Supply Drum

Outside diameter . . . . . 12 inches.
Rear end tapped . . . . . 4 inches.
Drip tapped . . . . . 2 inches.

Return Drums

Outside diameter . . . . . 8 inches.
Rear end tapped . . . . . 4 inches.

* Tappings other than regular can be made Special to order.

When boiler is to be used for water warming, specify on order the size of supply and return pipe tappings.

Steam Trimmings Furnished

Lever safety valve; 10″ I. B. steam gage and syphon; water column complete, including three ¾″ gage cocks, and ¾″ water gage cocks (glass ¾″ x 14″).

Fire Tools Furnished

Ash shovel, hoe, poker, flue brush and handle.

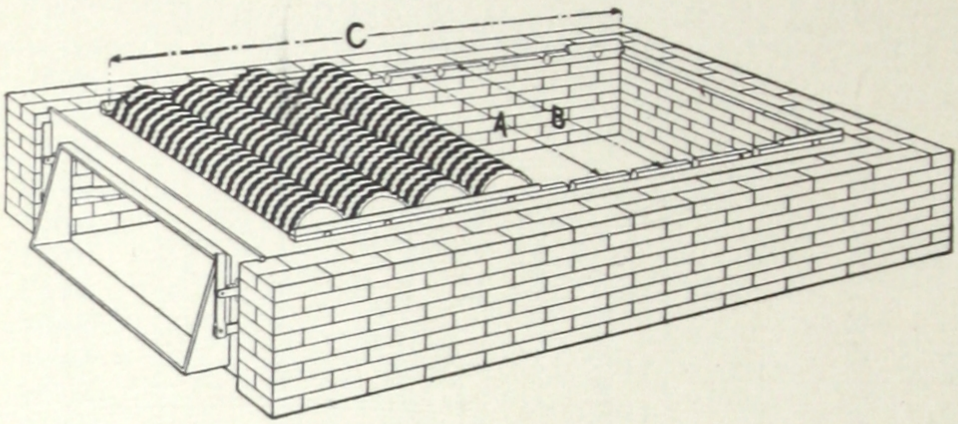
Asbestos Plaster

At the base of each section, and forming the sides of the fire-pot, are pockets which are to be filled with asbestos plaster. A sufficient amount of the plaster is furnished for this purpose only. These pockets should be filled as the sections are placed in position.

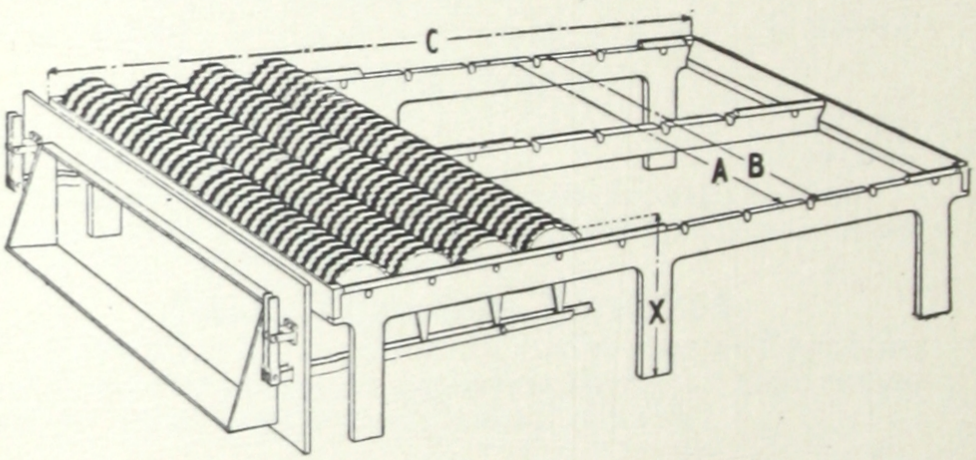
BOILER SPECIALTIES

REED GRATE

As Used under Tubular Boilers



On Bed Plate (Single Grate)



On Legs (Double Grate)

NOTE. — Specify on order whether Grate is to be used on Legs or Bed Plate.

REED GRATE

List of Sizes

Single Grate				Double Grate			
Width **B** in In.	Length **C** in In.	Surface Sq. Ft.	Price	Width **B** in In.	Length **C** in In.	Surface Sq. Ft.	Price
18	20½	2¼	$18.00	42	44½	12¼	$85.75
18	26½	3	24.00	42	50½	14	98.00
18	32½	3¾	30.00	42	56½	15¾	110.25
18	38½	4½	36.00	42	62½	17½	122.50
18	44½	5¼	42.00	42	68½	19¼	134.75
18	50½	6	48.00	48	50½	16	112.00
18	56½	6¾	54.00	48	56½	18	126.00
18	62½	7½	60.00	48	62½	20	140.00
24	26½	4	32.00	48	68½	22	154.00
24	32½	5	40.00	48	74½	24	168.00
24	38½	6	48.00	54	56½	20¼	141.75
24	44½	7	56.00	54	62½	22½	157.50
24	50½	8	64.00	54	68½	24¾	173.25
24	56½	9	72.00	54	74½	27	189.00
24	62½	10	80.00	54	80½	29¼	204.75
24	68½	11	88.00	62	62½	25	150.00
31	32½	6¼	43.75	62	68½	27½	165.00
31	38½	7½	52.50	62	74½	30	180.00
31	44½	8¾	61.25	62	80½	32½	195.00
31	50½	10	70.00	62	86½	35	210.00
31	56½	11¼	78.75	72	74½	36	216.00
31	62½	12½	87.50	72	80½	39	234.00
31	68½	13¾	96.25	72	86½	42	252.00
31	74½	15	105.00	72	92½	45	270.00
36	38½	9	63.00	72	98½	48	288.00
36	44½	10½	73.50	.....	.....	.....	.....
36	50½	12	84.00	.....	.....	.....	.....
36	56½	13½	94.50	.....	.....	.....	.....
36	62½	15	105.00	.....	.....	.....	.....
36	68½	16½	115.50	.....	.....	.....	.....
36	74½	18	126.00	.....	.....	.....	.....
36	80½	19½	136.50	.....	.....	.....	.....

In ordering state distance from bottom of ash-pit to top of grate.

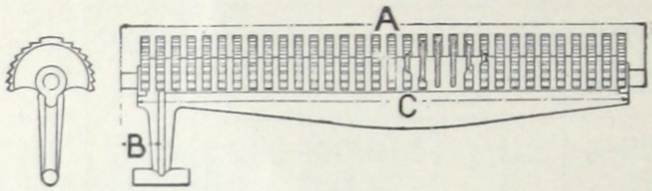
Dimension **A** = 2″ less than **B** in each case.

Dimension **C** = 2½″ less in each case when bed plates are furnished instead of legs.

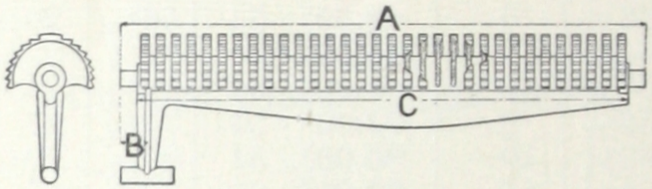
Notice. — Specify on order the height to top of grate "**X.**"

REED GRATE

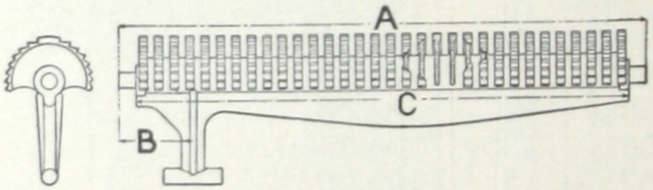
The following descriptions refer to Grate Bars as used on Special Legs and Bed Plates. See pages 74 and 75.



Name of Grate	A	B	C
Short Bolt Gold, 3 and 4 Sections	17 3/8"	2 3/8"	14 3/4"
Short Bolt Gold, 5, 6 and 7 Sections	17 7/8"	2 3/8"	14 3/4"



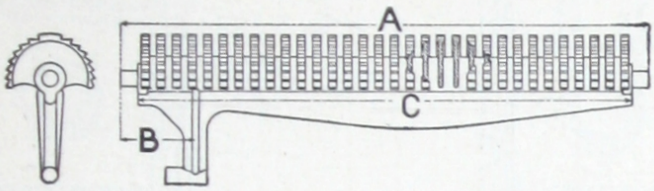
Name of Grate	A	B	C
No. 1 Gold	18"	2 1/4"	16"
No. 2 Gold	23 1/2"	2"	21 1/2"
Special 36 Inch	36"	3"	33 1/2"



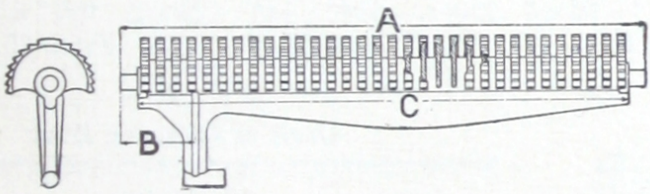
Name of Grate	A	B	C
No. 1 Mills	21 1/2"	3 1/2"	19 1/2"
No. 3 Mills	26 1/4"	4"	24"
No. 4 Mills	31 1/2"	3 1/4"	29"
No. 5 Mills	31"	3 1/2"	28 3/4"
No. 5 1/2 Mills	48"	3 1/2"	45 1/2"
No. 6 Geyser	23 1/2"	3 1/4"	21 1/2"
No. 8 Geyser	27 1/4"	3 3/8"	25"
Special 21 Inch	20 1/2"	3 1/4"	18 5/8"

REED GRATE

The following descriptions refer to Grate Bars as used in *Double* Grates. See pages 74 and 75.

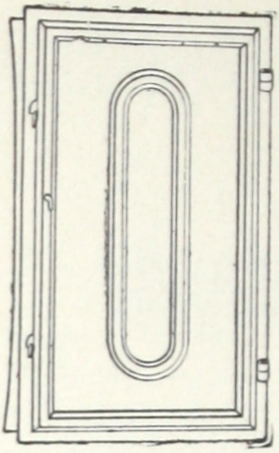


Name of Grate	A	B	C
No. 1 Mills	21½″	3½″	19½″
No. 3 Mills	26¼″	4″	24″
No. 5 Mills	31″	3½″	28¾″
No. 1 Gold	18″	5″	16″
No. 2 Gold	23½″	4⅝″	21½″
Special 36 Inch	36″	5¾″	33½″

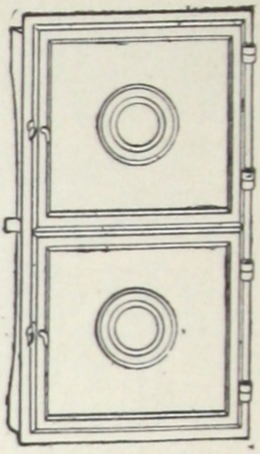


Name of Grate	A	B	C
No. 1 Mills	21½″	3½″	19½″
No. 3 Mills	26¼″	4″	24″
No. 5 Mills	31″	3½″	28¾″
No. 1 Gold	18″	5″	16″
No. 2 Gold	23½″	4⅝″	21½″
Special 36 Inch	36″	5¾″	33½″

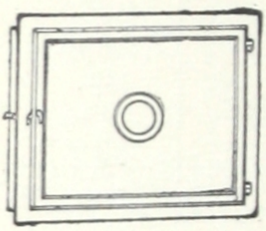
SPECIAL DOORS AND FRAMES



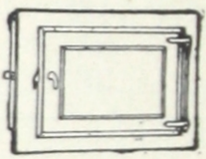
Cast Iron Door and Frame
Frame, 19½″ x 37½″
Door, 19¼″ x 37¼″
Price $8.00



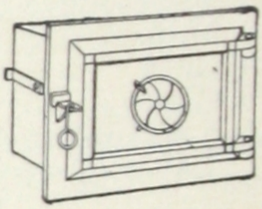
Cast Iron Frame and Double Doors
Frame, 19¼″ x 32¾″
Doors, 19½″ x 19½″
Price $8.00



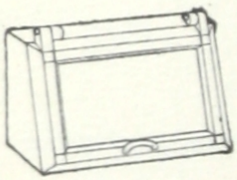
Cleaning Door and Frame
Frame, 16⅛″ x 19″
Door, 16¼″ x 19¼″
Price $5.00



Cleaning Door and Frame
Frame, 6¼″ x 10¾″
Door, 6½″ x 11″
Price $1.50

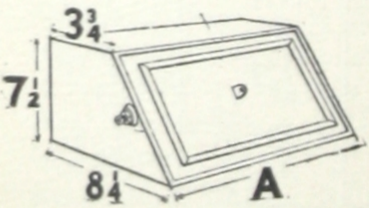


Special Fire Door and Frame
Frame, 9½″x13¾″x8⅝″
Door, 9¼″ x 13⅝″
Price $5.00



Draft or Cleaning Door

DOOR	FRAME	PRICE
7¼″ x 8¼″	8¾″ x 7½″ x 8⅔″	$2.50
9½″ x 13¼″	9¾″ x 9½″ x 13″	3.50
10⅝″ x 18″	9¾″ x 9½″ x 18″	4.00



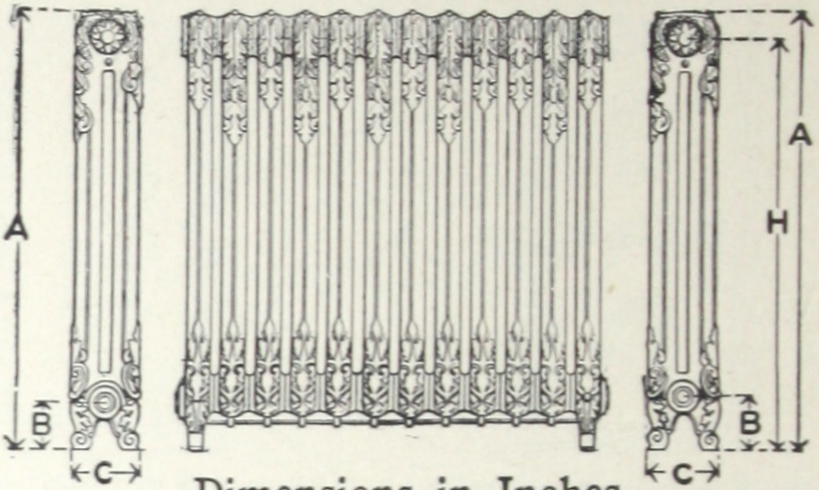
Swivel Draft Door

DIMENSION	PRICE
A = 8½ inches.....	$2.50
A = 12½ inches.....	3.50
A = 16½ inches.....	4.00

DIRECT RADIATORS

SINGLE-COLUMN IMPERIAL

Steam and Water



Dimensions in Inches

A	Height of radiator . . .	45	37	31	25	19
H	Height of top tapping .	43 3/16	34 11/16	28 7/8	23	17

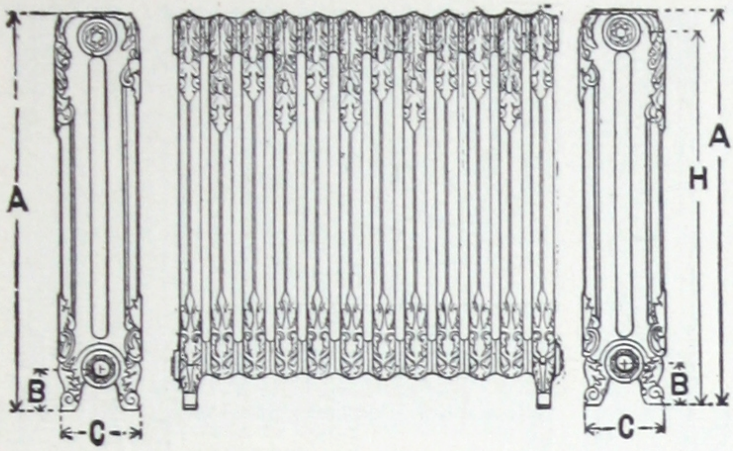
B Height of regular tapping . . . . . 4 5/8 inches
C Width of section . . . . . 5 1/4 "

List of Sizes

Number of Sections	Total Length Feet	Total Length In.	Radiating Surface (Square Feet) 45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10	13½	10½	9	7½	6
4	1	1	18	14	12	10	8
5	1	4	22½	17½	15	12½	10
6	1	7	27	21	18	15	12
7	1	10	31½	24½	21	17½	14
8	2	1	36	28	24	20	16
9	2	4	40½	31½	27	22½	18
10	2	7	45	35	30	25	20
11	2	10	49½	38½	33	27½	22
12	3	1	54	42	36	30	24
13	3	4	58½	45½	39	32½	26
14	3	7	63	49	42	35	28
15	3	10	67½	52½	45	37½	30
16	4	1	72	56	48	40	32
17	4	4	76½	59½	51	42½	34
18	4	7	81	63	54	45	36
19	4	10	85½	66½	57	47½	38
20	5	1	90	70	60	50	40
21	5	4	94½	73½	63	52½	42
22	5	7	99	77	66	55	44
23	5	10	103½	80½	69	57½	46
24	6	1	108	84	72	60	48
25	6	4	112½	87½	75	62½	50
List Price in Cents per Square Foot			41	42	46	50	57

TWO-COLUMN IMPERIAL

Steam or Water



Dimensions in Inches

A	Height of Radiator . . .	45	37	31	25	19
H	Height of Top Tapping .	43	35	29	23	17

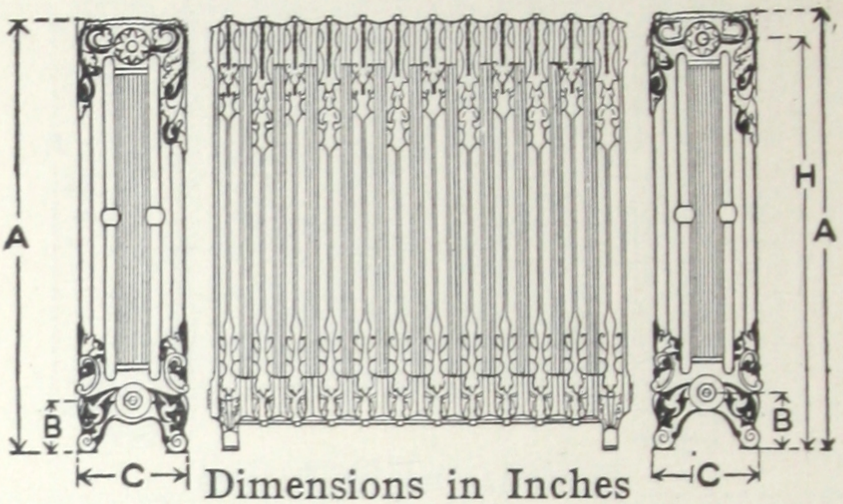
B Height of Regular Tapping . . . . . 4⅝ inches
C Width of Section . . . . . 7 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Feet	In.	45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10	15	12	10½	9	6¾
4	1	1	20	16	14	12	9
5	1	4	25	20	17½	15	11¼
6	1	7	30	24	21	18	13½
7	1	10	35	28	24½	21	15¾
8	2	1	40	32	28	24	18
9	2	4	45	36	31½	27	20¼
10	2	7	50	40	35	30	22½
11	2	10	55	44	38½	33	24¾
12	3	1	60	48	42	36	27
13	3	4	65	52	45½	39	29¼
14	3	7	70	56	49	42	31½
15	3	10	75	60	52½	45	33¾
16	4	1	80	64	56	48	36
17	4	4	85	68	59½	51	38¼
18	4	7	90	72	63	54	40½
19	4	10	95	76	66½	57	42¾
20	5	1	100	80	70	60	45
21	5	4	105	84	73½	63	47¼
22	5	7	110	88	77	66	49½
23	5	10	115	92	80½	69	51¾
24	6	1	120	96	84	72	54
25	6	4	125	100	87½	75	56¼
List Price in Cents per Square Foot			**41**	**42**	**46**	**50**	**57**

THREE-COLUMN IMPERIAL

Steam and Water



Dimensions in Inches

A Height of Radiator . . .	45	37	31	25	19
H Height of Top Tapping . .	43 1/16	35 1/8	29 1/16	23 1/16	17 3/16

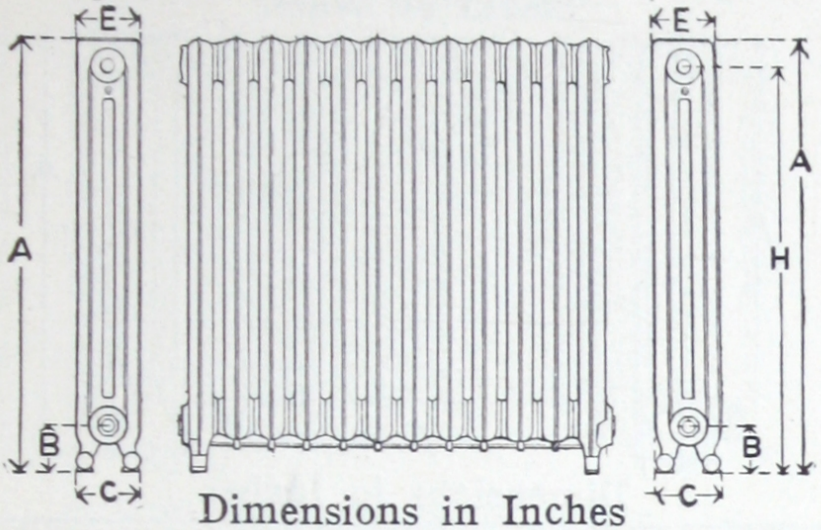
B Height of Regular Tapping . . . . . 4 5/8 inches
C Width of Section . . . . . 9 "

List of Sizes

Number of Sections	Total Length Feet	In.	Radiating Surface (Square Feet) 45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10 3/4	24	19 1/2	16 1/2	13 1/2	10 1/2
4	1	2	32	26	22	18	14
5	1	5 1/4	40	32 1/2	27 1/2	22 1/2	17 1/2
6	1	8 1/2	48	39	33	27	21
7	1	11 3/4	56	45 1/2	38 1/2	31 1/2	24 1/2
8	2	3	64	52	44	36	28
9	2	6 1/4	72	58 1/2	49 1/2	40 1/2	31 1/2
10	2	9 1/2	80	65	55	45	35
11	3	3/4	88	71 1/2	60 1/2	49 1/2	38 1/2
12	3	4	96	78	66	54	42
13	3	7 1/4	104	84 1/2	71 1/2	58 1/2	45 1/2
14	3	10 1/2	112	91	77	63	49
15	4	1 3/4	120	97 1/2	82 1/2	67 1/2	52 1/2
16	4	5	128	104	88	72	56
17	4	8 1/4	136	110 1/2	93 1/2	76 1/2	59 1/2
18	4	11 1/2	144	117	99	81	63
19	5	2 3/4	152	123 1/2	104 1/2	85 1/2	66 1/2
20	5	6	160	130	110	90	70
21	5	9 1/4	168	136 1/2	115 1/2	94 1/2	73 1/2
22	6	1/2	176	143	121	99	77
23	6	3 3/4	184	149 1/2	126 1/2	103 1/2	80 1/2
24	6	7	192	156	132	108	84
25	6	10 1/4	200	162 1/2	137 1/2	112 1/2	87 1/2
List Price in Cents per Square Foot			41	42	46	50	57

SINGLE-COLUMN PRINCESS

Steam and Water



Dimensions in Inches

A Height of Radiator . . .	45	37	31	25	19
H Height of Top Tapping . .	43 1/8	34 9/16	28 15/16	23	17

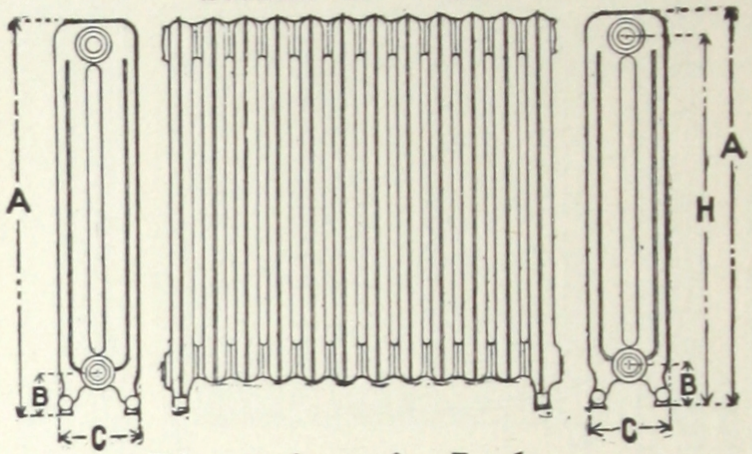
B Height of Regular Tapping . . . . . 4 5/8 inches
C Width of Section . . . . . 5 1/4 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Feet	In.	45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10	13½	10½	9	7½	6
4	1	1	18	14	12	10	8
5	1	4	22½	17½	15	12½	10
6	1	7	27	21	18	15	12
7	1	10	31½	24½	21	17½	14
8	2	1	36	28	24	20	16
9	2	4	40½	31½	27	22½	18
10	2	7	45	35	30	25	20
11	2	10	49½	38½	33	27½	22
12	3	1	54	42	36	30	24
13	3	4	58½	45½	39	32½	26
14	3	7	63	49	42	35	28
15	3	10	67½	52½	45	37½	30
16	4	1	72	56	48	40	32
17	4	4	76½	59½	51	42½	34
18	4	7	81	63	54	45	36
19	4	10	85½	66½	57	47½	38
20	5	1	90	70	60	50	40
21	5	4	94½	73½	63	52½	42
22	5	7	99	77	66	55	44
23	5	10	103½	80½	69	57½	46
24	6	1	108	84	72	60	48
25	6	4	112½	87½	75	62½	50
List Price in Cents per Square Foot			41	42	46	50	57

TWO-COLUMN PRINCESS

Steam or Water



Dimensions in Inches

A	Height of Radiator . . .	45	37	31	25	19
H	Height of Top Tapping .	43	35	29	23	17

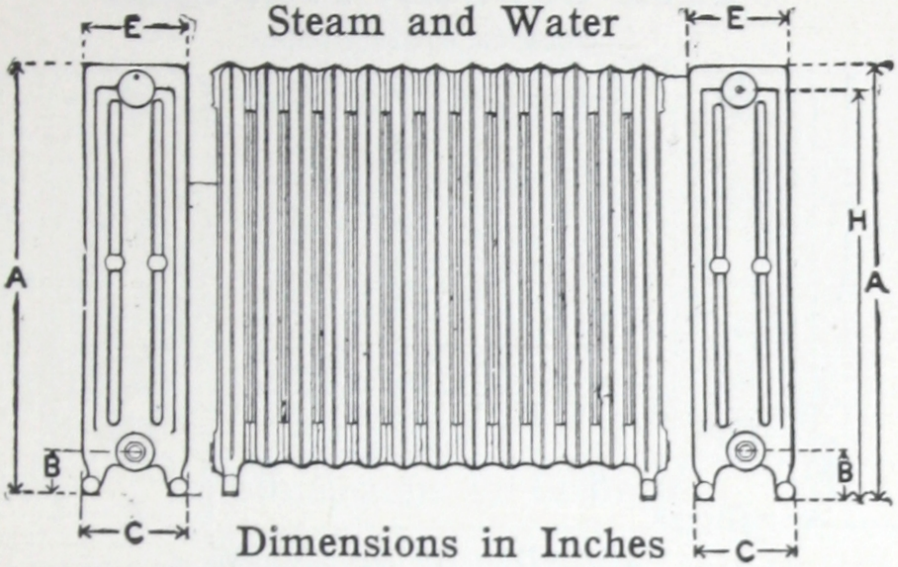
B Height of Regular Tapping . . . . . 4⅝ inches
C Width of Section . . . . . 7 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Feet	In.	45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10	15	12	10½	9	6¾
4	1	1	20	16	14	12	9
5	1	4	25	20	17½	15	11¼
6	1	7	30	24	21	18	13½
7	1	10	35	28	24½	21	15¾
8	2	1	40	32	28	24	18
9	2	4	45	36	31½	27	20¼
10	2	7	50	40	35	30	22½
11	2	10	55	44	38½	33	24¾
12	3	1	60	48	42	36	27
13	3	4	65	52	45½	39	29¼
14	3	7	70	56	49	42	31½
15	3	10	75	60	52½	45	33¾
16	4	1	80	64	56	48	36
17	4	4	85	68	59½	51	38¼
18	4	7	90	72	63	54	40½
19	4	10	95	76	66½	57	42¾
20	5	1	100	80	70	60	45
21	5	4	105	84	73½	63	47¼
22	5	7	110	88	77	66	49½
23	5	10	115	92	80½	69	51¾
24	6	1	120	96	84	72	54
25	6	4	125	100	87½	75	56¼
List Price in Cents per Square Foot			**41**	**42**	**46**	**50**	**57**

THREE-COLUMN PRINCESS

Steam and Water



Dimensions in Inches

A	Height of Radiator . . .	45	37	31	25	19
H	Height of Top Tapping .	43	35	29 1/16	23 3/16	17 3/16

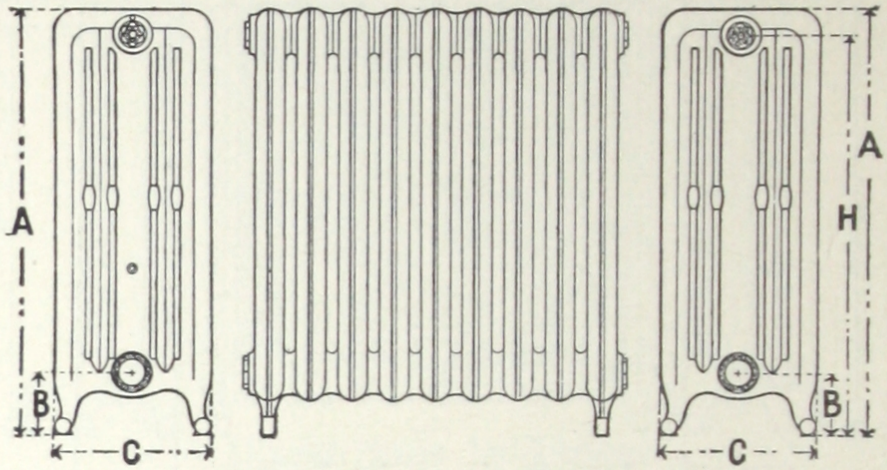
B Height of Regular Tapping . . . . . 4 5/8 inches
C Width of Section . . . . . 9 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Feet	In.	45 In. High	37 In. High	31 In. High	25 In. High	19 In. High
3	0	10¾	24	19½	16½	13½	10½
4	1	2	32	26	22	18	14
5	1	5¼	40	32½	27½	22½	17½
6	1	8½	48	39	33	27	21
7	1	11¾	56	45½	38½	31½	24½
8	2	3	64	52	44	36	28
9	2	6¼	72	58½	49½	40½	31½
10	2	9½	80	65	55	45	35
11	3	¾	88	71½	60½	49½	38½
12	3	4	96	78	66	54	42
13	3	7¼	104	84½	71½	58½	45½
14	3	10½	112	91	77	63	49
15	4	1¾	120	97½	82½	67½	52½
16	4	5	128	104	88	72	56
17	4	8¼	136	110½	93½	76½	59½
18	4	11½	144	117	99	81	63
19	5	2¾	152	123½	104½	85½	66½
20	5	6	160	130	110	90	70
21	5	9¼	168	136½	115½	94½	73½
22	6	½	176	143	121	99	77
23	6	3¾	184	149½	126½	103½	80½
24	6	7	192	156	132	108	84
25	6	10¼	200	162½	137½	112½	87½
List Price in Cents per Square Foot			41	42	46	50	57

FIVE-COLUMN PRINCESS

Steam and Water



Dimensions in Inches

A	Height of Radiator	37	25
H	Height of Top Tapping	35	23
B	Height of Regular Tapping	4⅝ inches	
C	Width of Section	12 "	

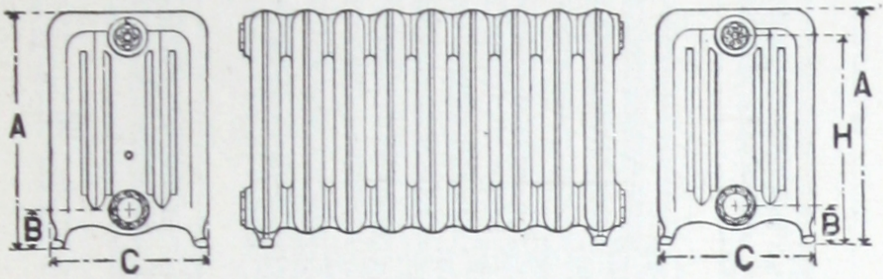
List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)	
	Feet	In.	37 In. High	25 In. High
3	0	10¾	30	21
4	1	2	40	28
5	1	5¼	50	35
6	1	8½	60	42
7	1	11¾	70	49
8	2	3	80	56
9	2	6¼	90	63
10	2	9½	100	70
11	3	0¾	110	77
12	3	4	120	84
13	3	7¼	130	91
14	3	10½	140	98
15	4	1¾	150	105
16	4	5	160	112
17	4	8¼	170	119
18	4	11½	180	126
19	5	2¾	190	133
20	5	6	200	140
21	5	9¼	210	147
22	6	0½	220	154
23	6	3¾	230	161
24	6	7	240	168
25	6	10¼	250	175
List Price in Cents per Square Foot			**42**	**50**

FIVE-COLUMN PRINCESS

(Window Radiator)

Steam and Water



Dimensions in Inches

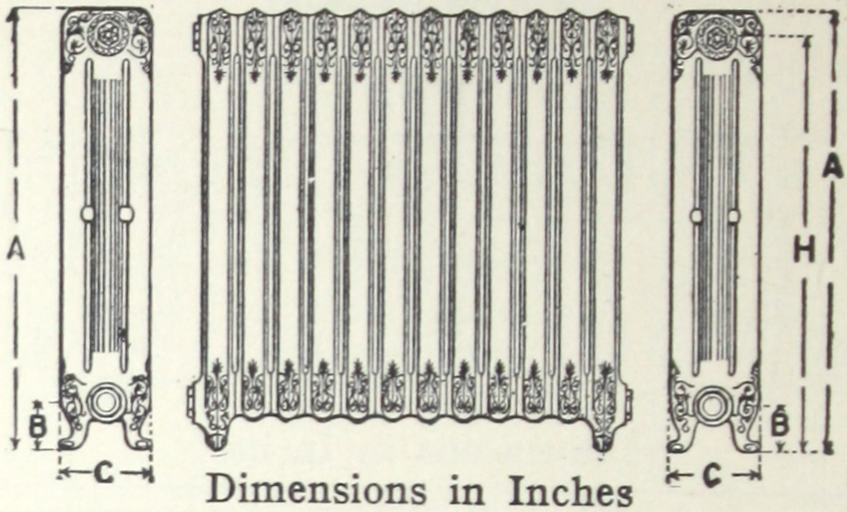
A	Height of Radiator	16	14	12
H	Height of Top Tapping	14	12	10
B	Height of Regular Tapping	3 inches		
C	Width of Section	12 "		

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)		
	Feet	Inches	16 In. High	14 In. High	12 In. High
3	0	10¾	14	12	10
4	1	2	18⅔	16	13⅓
5	1	5¼	23⅓	20	16⅔
6	1	8½	28	24	20
7	1	11¾	32⅔	28	23⅓
8	2	3	37⅓	32	26⅔
9	2	6¼	42	36	30
10	2	9½	46⅔	40	33⅓
11	3	0¾	51⅓	44	36⅔
12	3	4	56	48	40
13	3	7¼	60⅔	52	43⅓
14	3	10½	65⅓	56	46⅔
15	4	1¾	70	60	50
16	4	5	74⅔	64	53⅓
17	4	8¼	79⅓	68	56⅔
18	4	11½	84	72	60
19	5	2¾	88⅔	76	63⅓
20	5	6	93⅓	80	66⅔
21	5	9¼	98	84	70
22	6	0½	102⅔	88	73⅓
23	6	3¾	107⅓	92	76⅔
24	6	7	112	96	80
25	6	10¼	116⅔	100	83⅓
List Price in Cents per Square Foot			60	64	68

ROYAL UNION

Steam or Water



Dimensions in Inches

A Height of Radiator . . .	44	38	30	24	18
H Height of Top Tapping .	41 15/16	35 7/16	27 15/16	21 7/8	15 7/8

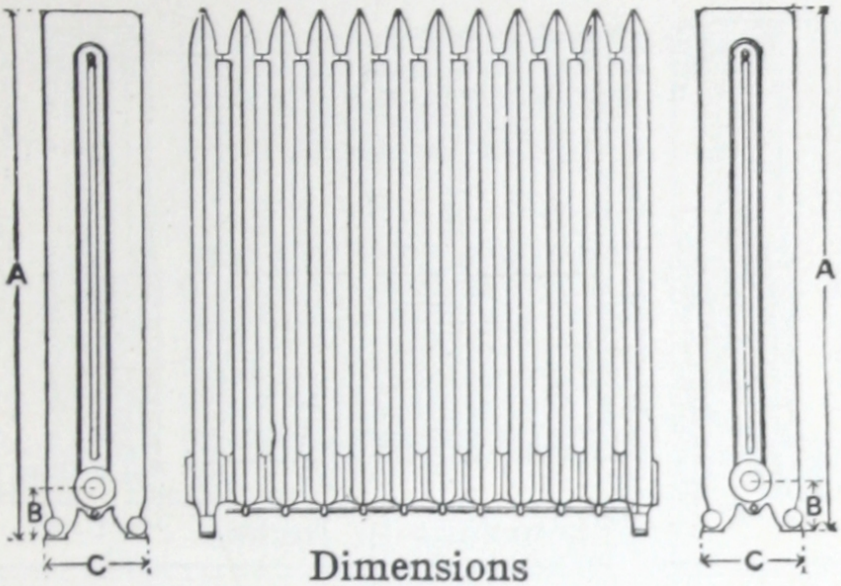
B Height of Regular Tapping . . . . . 4 5/8 inches
C Width of Section . . . . . 8 5/8 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Ft.	In.	44 In. High	38 In. High	30 In. High	24 In. High	18 In. High
3	0	10	18	15	12	9	6
4	1	1	24	20	16	12	8
5	1	4	30	25	20	15	10
6	1	7	36	30	24	18	12
7	1	10	42	35	28	21	14
8	2	1	48	40	32	24	16
9	2	4	54	45	36	27	18
10	2	7	60	50	40	30	20
11	2	10	66	55	44	33	22
12	3	1	72	60	48	36	24
13	3	4	78	65	52	39	26
14	3	7	84	70	56	42	28
15	3	10	90	75	60	45	30
16	4	1	96	80	64	48	32
17	4	4	102	85	68	51	34
18	4	7	108	90	72	54	36
19	4	10	114	95	76	57	38
20	5	1	120	100	80	60	40
21	5	4	126	105	84	63	42
22	5	7	132	110	88	66	44
23	5	10	138	115	92	69	46
24	6	1	144	120	96	72	48
25	6	4	150	125	100	75	50
List Price in Cents per Square Foot			**41**	**42**	**46**	**50**	**58**

SCEPTER

Steam Only



Dimensions

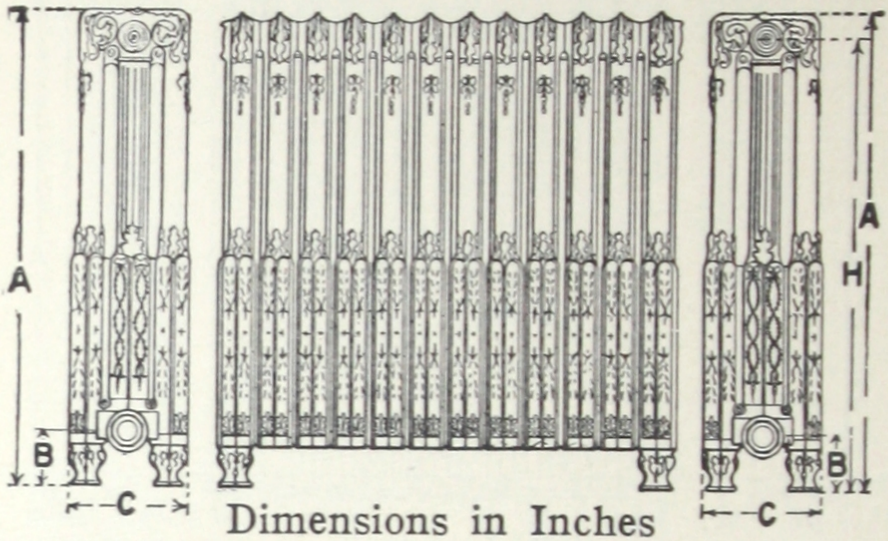
A Height of Radiator . . . . . (See table below)
B Height of Regular Tapping . . . . . 5 inches
C Width of Section . . . . . 7 "

List of Sizes

Number of Sections	Total Length		Radiating Surface (Square Feet)				
	Ft.	In.	44 In. High	38 In. High	30 In. High	24 In. High	18 In. High
3	0	8 1/8	14 1/4	12	9	7	5
4	0	10 1/2	19	16	12	9 1/3	6 2/3
5	1	0 7/8	23 3/4	20	15	11 2/3	8 1/3
6	1	3 1/4	28 1/2	24	18	14	10
7	1	5 5/8	33 1/4	28	21	16 1/3	11 2/3
8	1	8	38	32	24	18 2/3	13 1/3
9	1	10 3/8	42 3/4	36	27	21	15
10	2	0 3/4	47 1/2	40	30	23 1/3	16 2/3
11	2	3 1/8	52 1/4	44	33	25 2/3	18 1/3
12	2	5 1/2	57	48	36	28	20
13	2	7 7/8	61 3/4	52	39	30 1/3	21 2/3
14	2	10 1/4	66 1/2	56	42	32 2/3	23 1/3
15	3	0 5/8	71 1/4	60	45	35	25
16	3	3	76	64	48	37 1/3	26 2/3
17	3	5 3/8	80 3/4	68	51	39 2/3	28 1/3
18	3	7 3/4	85 1/2	72	54	42	30
19	3	10 1/8	90 1/4	76	57	44 1/3	31 2/3
20	4	0 1/2	95	80	60	46 2/3	33 1/3
21	4	2 7/8	99 3/4	84	63	49	35
22	4	5 1/4	104 1/2	88	66	51 1/3	36 2/3
23	4	7 5/8	109 1/4	92	69	53 2/3	38 1/3
24	4	10	114	96	72	56	40
25	5	0 3/8	118 3/4	100	75	58 1/3	41 2/3
List Price in Cents per Square Foot			41	42	46	50	58

SOVEREIGN

Steam or Water



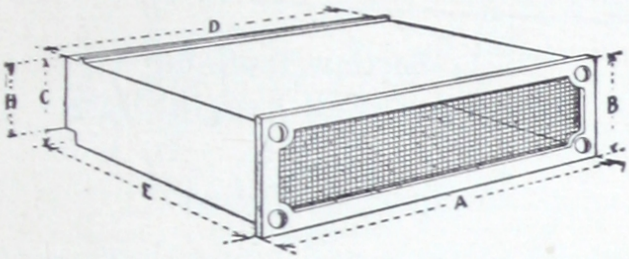
Dimensions in Inches

A	Height of Radiator	37	31	25
H	Height of Top Tapping	35 3/8	29 9/16	23 7/8
B	Height of Regular Tapping	5 inches		
C	Width of Section	8 1/2 "		

List of Sizes

Number of Sections	Total Length Feet	Total Length Inches	Radiating Surface (Square Feet) 37 In. High	31 In. High	25 In. High
6	1	5 1/8	36	30	24
7	1	7 13/16	42	35	28
8	1	10 1/2	48	40	32
9	2	1 3/16	54	45	36
10	2	3 7/8	60	50	40
11	2	6 9/16	66	55	44
12	2	9 1/4	72	60	48
13	2	11 15/16	78	65	52
14	3	2 5/8	84	70	56
15	3	5 5/16	90	75	60
16	3	8	96	80	64
17	3	10 11/16	102	85	68
18	4	1 3/8	108	90	72
19	4	4 1/16	114	95	76
20	4	6 3/4	120	100	80
21	4	9 7/16	126	105	84
22	5	1/8	132	110	88
23	5	2 13/16	138	115	92
24	5	5 1/2	144	120	96
25	5	8 3/16	150	125	100
List Price in Cents per Square Foot			42	46	50

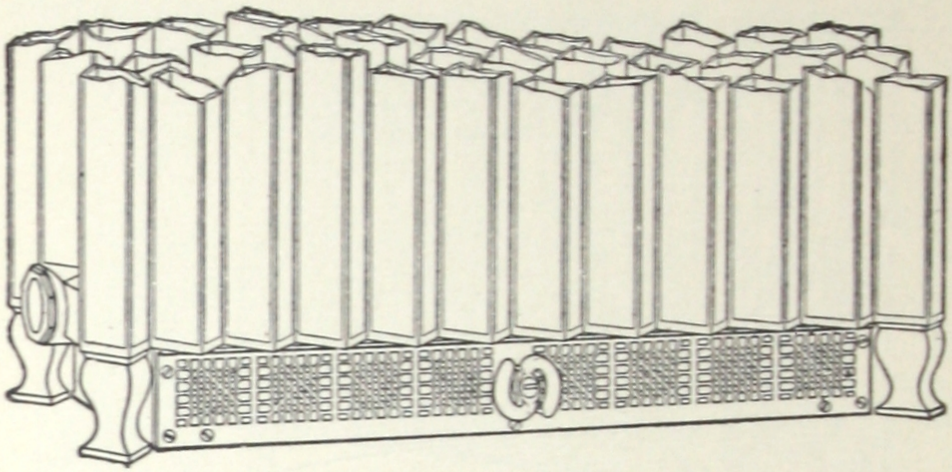
WALL BOX



Dimensions in Inches

Sizes	A	B	C	D	E	H	Price
2″ x 12″	13	3	$2\frac{7}{16}$	$12\frac{1}{2}$	9	$1\frac{7}{8}$	$2.00
2″ x 16″	17	3	$2\frac{7}{16}$	$16\frac{1}{2}$	9	$1\frac{7}{8}$	2.50
2″ x 20″	$20\frac{7}{8}$	3	$2\frac{7}{16}$	$20\frac{3}{8}$	9	$1\frac{7}{8}$	3.00

UNION DAMPER BASE
For Sovereign Radiator Only



12-Section Radiator
10-Section (Full Length) Base

Special Notice

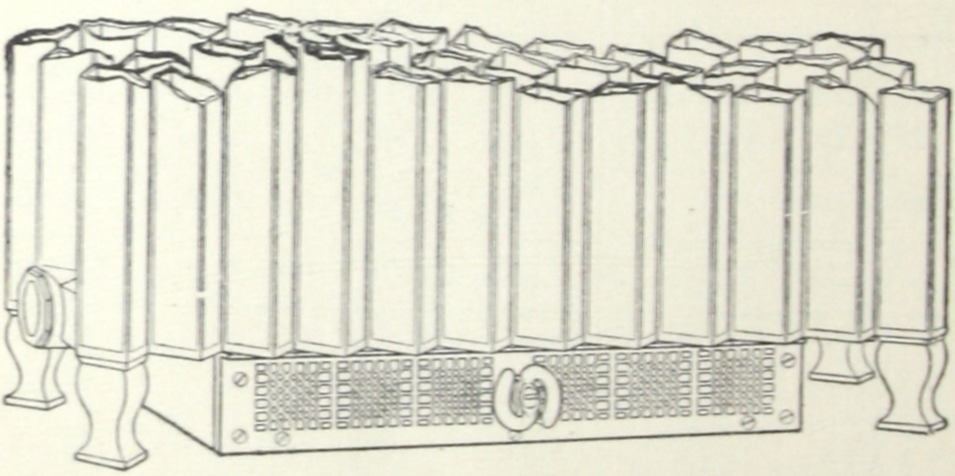
Radiators 21 sections and longer have center leg.

When center leg is used, Base cannot extend the full length of Radiator.

When Radiator longer than 20 sections is required to have Base under center of Radiator, specify on order that Radiator is to have two center legs, giving the distance (in sections) between center legs.

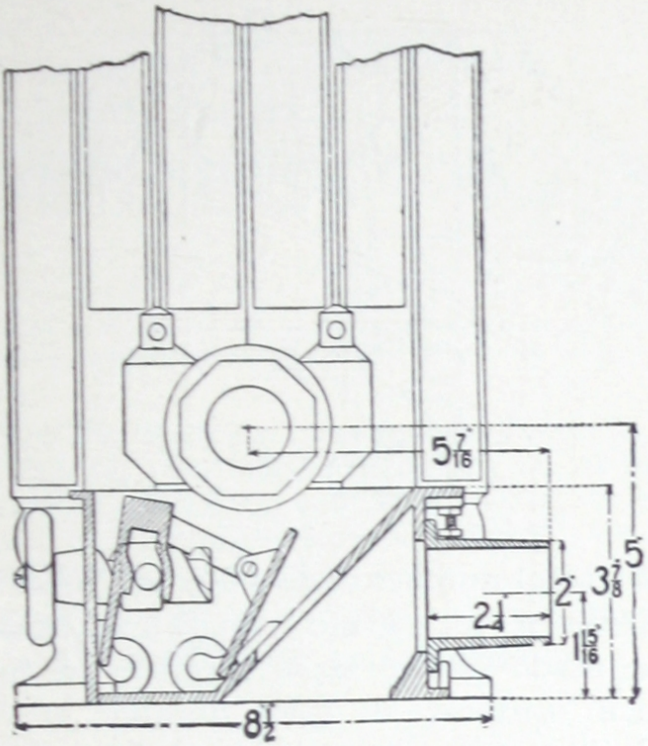
Specify on order (in sections) length of Base.

Each Radiator Section is $2\frac{11}{16}$ inches in length.

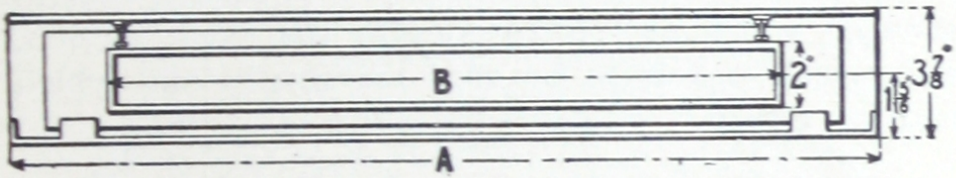


12-Section Radiator
8-Section Base

UNION DAMPER BASE
For Sovereign Radiator Only



Showing Construction and Method of Operation

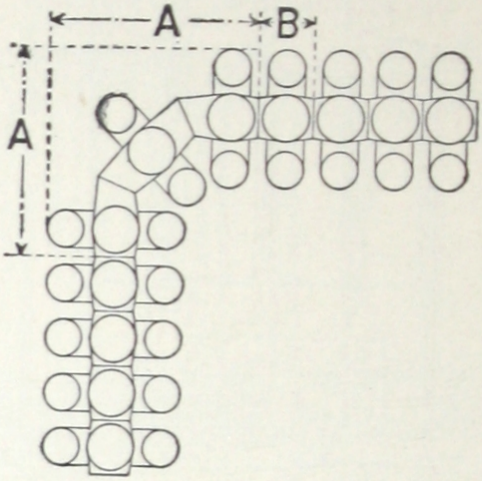


Rear View

Dimensions in Inches

Length of Base in Number of Sovereign Sections	A Length of Base	B Length of Thimble	Price
4	10 1/4	6 9/16	$2.50
5	13	6 9/16	3.00
6	15 5/8	9 1/2	3.50
7	18 3/8	11 15/16	4.00
8	21	14 5/16	4.50
9	23 3/4	17	5.00
10	26 3/8	19 15/16	5.50
11	29	19 15/16	6.00
12	31 3/4	19 15/16	6.50
13	34 1/2	19 15/16	7.00
14	37 1/8	19 15/16	7.50
15	39 7/8	19 15/16	8.00
16	42 1/2	19 15/16	8.50
17	45 1/4	19 15/16	9.00
18	47 7/8	19 15/16	9.50

CORNER RADIATOR



If the total number of sections in CORNER RADIATOR is odd (9, 11, 13, 15, etc.), each arm of the Radiator can be made of the same length. If, however, the Radiator contains an even number of Sections (8, 10, 12, 14, etc.), one arm must be longer than the other, in which case it is necessary to send a sketch, showing which arm is to contain the extra section, also which end is to be used for supply and which end for return.

Imperial and Princess

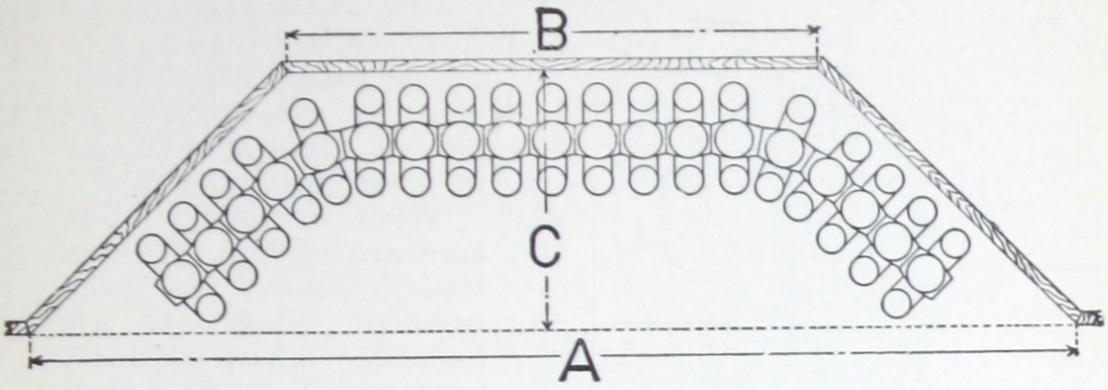
Dimensions in Inches

Style	A	B
Single Column	9¾	3
Two Column	10¼	3
Three Column	12⅝	3¼

PRICE

Add **$3.00 NET** per Radiator to Regular Price.

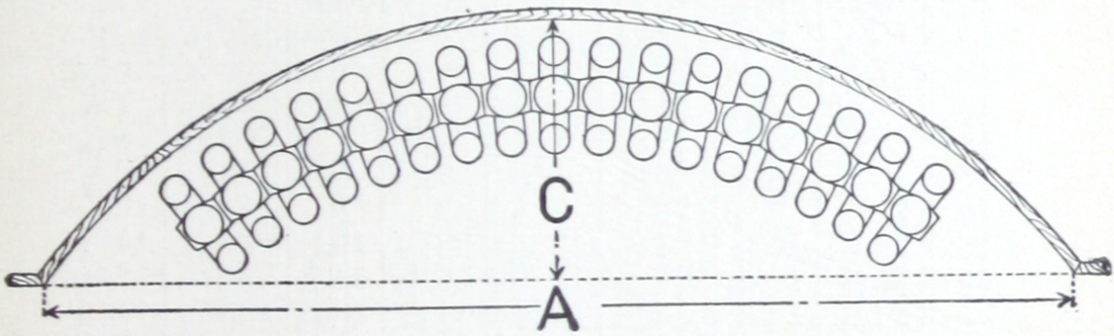
BAY WINDOW RADIATOR



BAY WINDOW RADIATORS can be assembled in any desired size and on any desired angle. In ordering, specify the size of Radiator required (either in number of sections, or in square feet of surface), and the dimensions **"A," "B,"** and **"C."**

PRICE: Add $6.00 NET per Radiator to regular price (= $3.00 NET for each angle)

CURVED RADIATOR



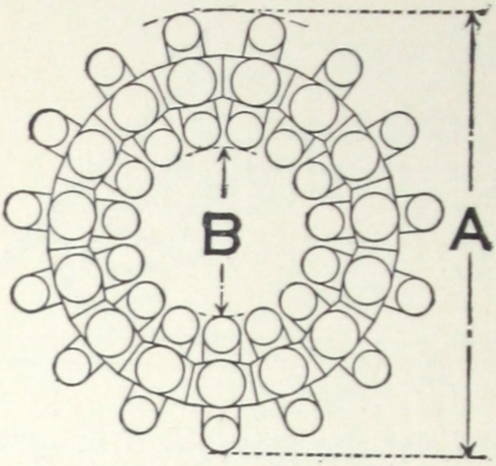
CURVED RADIATORS can be assembled in any desired size or on any desired radius. In ordering, specify the size of Radiator required (either in number of sections or in square feet of surface), and the dimensions **"A"** and **"C."**

PRICE: Add $0.60 NET per Section to regular price

Bay Window and Curved Radiators are made only in the following styles:

IMPERIAL: Single, Two and Three Column.
PRINCESS: Single, Two, Three and Five Column.

CIRCULAR RADIATOR



CIRCULAR RADIATORS can be assembled as one whole Radiator, or they can be assembled in halves for the purpose of encircling columns.

When Circular Radiators are in halves, each half becomes an independent Radiator. In ordering specify which method of assembling is desired.

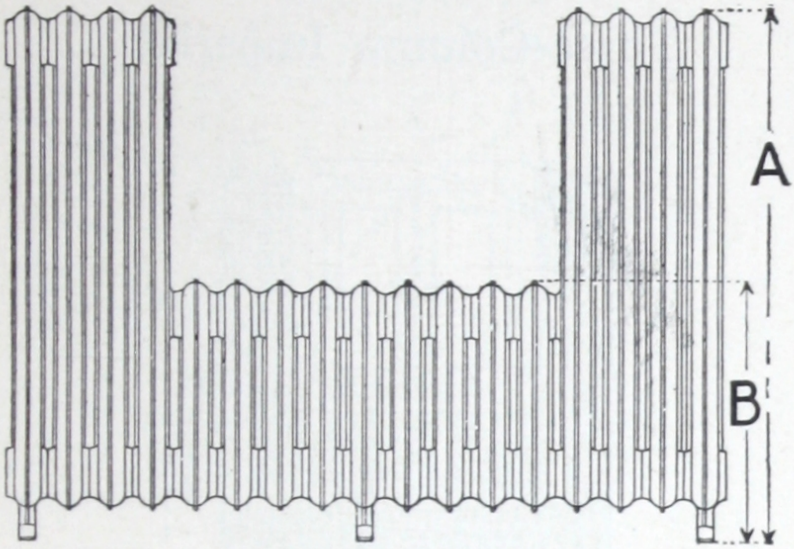
Imperial and Princess

Dimensions in Inches

Sections	Single Column Imperial and Princess		Two Column Imperial and Princess		Three Column Imperial and Princess		Five Column Princess	
	A	B	A	B	A	B	A	B
9	14 3/4	4 1/4	18 1/4	4 1/4	22	4	....	....
10	15 9/16	5 1/16	19	5	22 11/16	4 11/16	....	....
11	16 1/4	5 3/4	19 3/4	5 3/4	23 3/8	5 3/8	....	....
12	17 1/16	6 9/16	20 7/16	6 7/16	24 1/8	6 1/8	30 5/8	6 5/8
13	17 5/8	7 1/8	21 1/8	7 1/8	24 7/8	6 7/8	31 7/16	7 7/16
14	18 9/16	8 1/16	21 3/4	7 3/4	25 9/16	7 9/16	32 5/16	8 5/16
15	19 1/4	8 3/4	22 11/16	8 11/16	26 3/8	8 3/8	33 1/16	9 1/16
16	20	9 1/2	23 3/8	9 3/8	27	9	33 11/16	9 11/16
18	21 7/16	10 15/16	24 7/8	10 7/8	28 1/8	10 1/8	35 1/4	11 1/4
20	22 15/16	12 7/16	26 7/16	12 7/16	29 9/16	11 9/16	36 7/8	12 7/8
22	24 3/8	13 7/8	27 13/16	13 13/16	31 1/16	13 1/16	38 1/8	14 1/8
24	26	15 1/2	29 1/4	15 1/4	32 3/8	14 3/8	39 15/16	15 15/16
26	27 1/4	16 3/4	30 9/16	16 9/16	33 13/16	15 13/16	41 1/4	17 1/4
28	28 15/16	18 7/16	32 1/4	18 1/4	35 13/16	17 13/16	43	19
30	30 5/16	19 13/16	33 13/16	19 13/16	37 5/8	19 5/8	44 1/2	20 1/2
32	31 3/4	21 1/4	35 1/8	21 1/8	39 9/16	21 9/16	45 3/4	21 3/4
34	33 3/8	22 7/8	37 1/8	23 1/8	41 3/8	23 3/8	47 7/16	23 7/16
36	34 7/8	24 3/8	38 1/2	24 1/2	43 5/16	25 5/16	49 3/16	25 3/16
38	36 1/4	25 3/4	39 15/16	25 15/16	45 3/8	27 3/8	51 3/8	27 3/8
40	37 7/8	27 3/8	41 3/8	27 3/8	47 13/16	29 13/16	52 3/8	28 3/8
45	41 1/4	30 3/4	44 7/16	30 7/16	51 5/8	33 5/8	55 3/4	31 3/4
50	45 1/8	34 5/8	49	35	56 7/8	38 7/8	60 1/8	36 1/8

PRICE: Add $0.60 NET per Section to regular price

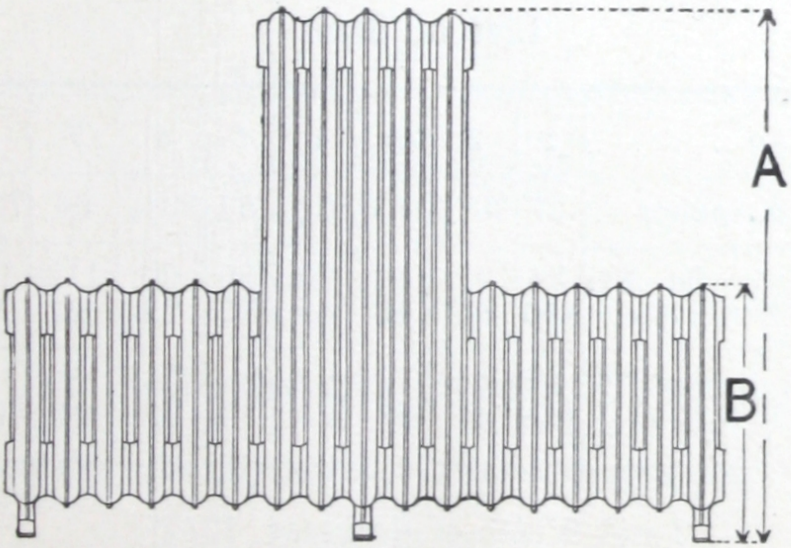
SPECIAL WINDOW RADIATOR



Special Window Radiators of different heights and sizes as per illustrations can be furnished in the Three-column Imperial and Princess Patterns.

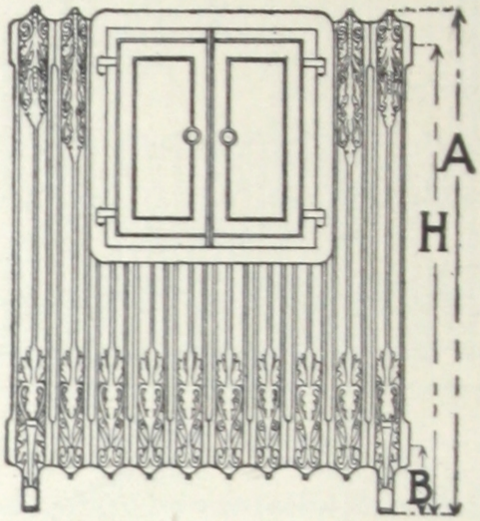
Specify on order the height of sections (**A** and **B**) and number of each. Also send sketch.

PRICE: Add $3.00 NET per Radiator



DINING-ROOM RADIATOR

Three-Column Imperial



Number 2, 37-Inch Radiator

Inside Dimensions of Oven

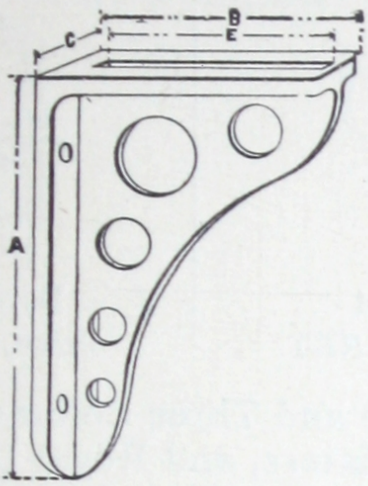
Height, 17″ Width, 18¼″ Depth, 11″

List of Sizes

Number		1	2	3	4	5	6	7	8
Length, inches .		27	33½	40	46½	53	59½	66	72½
37″ High,	Sq. Ft.	34	47	60	73	86	99	112	125
	Price	$50	55	60	65	70	75	80	85
45″ High,	Sq. Ft.	43	59	75	91	107	123	139	155
	Price	$55	61	67	73	79	85	91	97

Total Width of Radiator, 12⅜″

RADIATOR BRACKETS



Wall Bracket

Dimensions

For Three Column Imperial and Princess Radiators

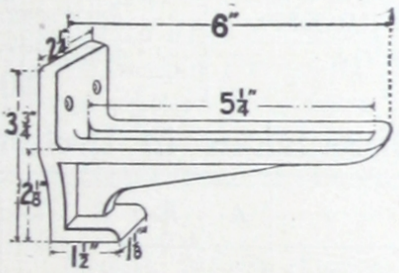
A = 16 inches
B = 11 "
C = 4 "
E = 9 "

Price, $2.00

For Single Column Imperial and Princess Radiators

A = 10 inches
B = 6¾ "
C = 3⅛ "
E = 5¼ "

Price, $1.00



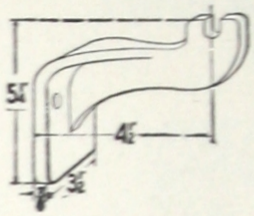
Baseboard Bracket

For Single Column Imperial and Princess Radiators only

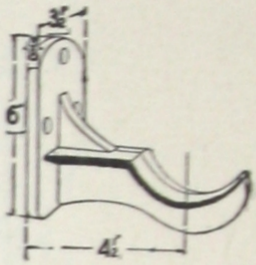
Price, $0.50

RADIATOR CONCEALED BRACKETS

For Scepter Radiator Only

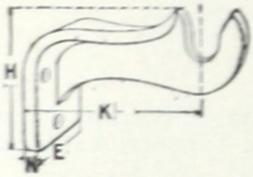


Top Bracket
Price, $0.12½ NET



Bottom Bracket
Price, $0.12½ NET

For Single, Two and Three Column Imperial and Princess Radiators, and Royal Union Radiator only.

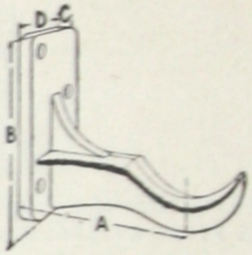


Top Bracket

Price for Single Column Imperial and Princess, $0.12½ NET

Price for Two Column Imperial and Princess, $0.12½ NET

Price for Three Column Imperial and Princess, and Royal Union, $0.25 NET



Bottom Bracket

Price for Single Column Imperial and Princess, $0.12½ NET

Price for Two Column Imperial and Princess, $0.12½ NET

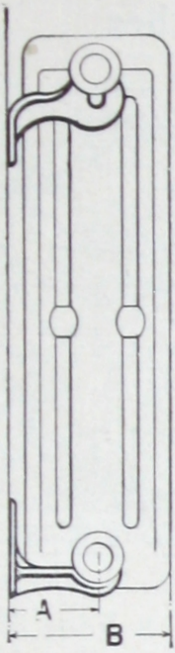
Price for Three Column Imperial and Princess, and Royal Union, $0.25 NET

Dimensions in Inches

Style	A	B	C	D	E	H	N	K
Single Column Imperial and Princess	3½	5½	⅜	3	3	4	⅜	3½
Two Column Imperial and Princess . . .	4½	6	⅜	3	3	5½	⅜	4½
Three Column Imperial and Princess and Royal Union . . .	5½	6½	½	4	4	5½	½	5½

RADIATOR CONCEALED BRACKETS

In Position



For Single, Two and Three Column Imperial and Princess, and Royal Union Radiators only

For Scepter Radiators only.

Dimensions in Inches

Style	A	B
Single Column Imperial and Princess	3½	6⅛
Two Column Imperial and Princess	4½	8
Three Column Imperial and Princess	5½	10
Royal Union	5½	10
Scepter	4½	8

Solid High Legs

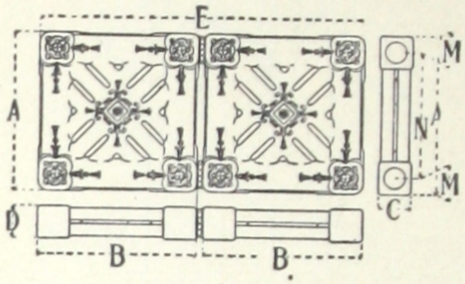
Radiators can be made higher by adding one, two, three or four inches to the legs, and can be made lower by cutting off the legs any amount.

When radiators are ordered to have legs other than of regular heights as advertised, an extra charge will be made of **$0.40** Net per Leg section.

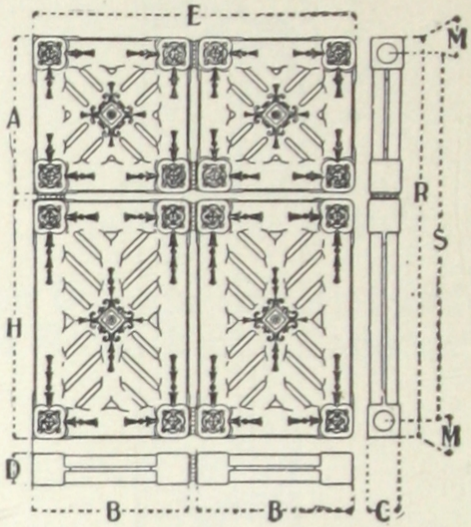
X-RAY WALL RADIATOR

Steam or Water

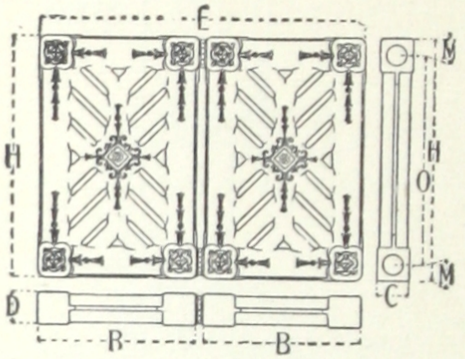
Dimensions in Inches



1 x 2 — 5-Foot

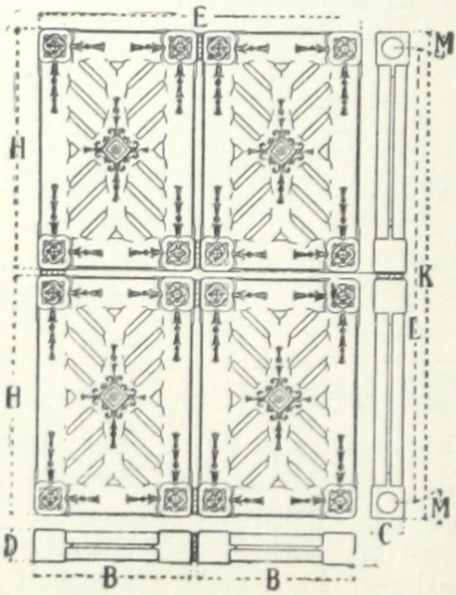


2 x 2 — 8-Foot — 5-Foot

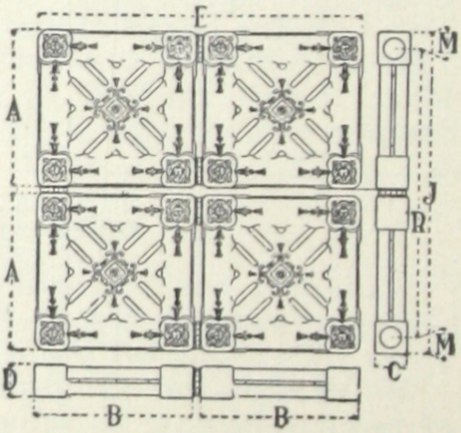


1 x 2 — 8-Foot

A	= $14\frac{5}{16}$″	L	= $41\frac{1}{4}$″
B	= $14\frac{5}{16}$″	M	= $1\frac{1}{2}$″
C	= $3\frac{1}{4}$″	N	= $11\frac{5}{16}$″
D	= $3\frac{1}{4}$″	O	= $18\frac{13}{16}$″
E	= $29\frac{3}{8}$″	R	= $36\frac{13}{16}$″
H	= $21\frac{3}{4}$″	S	= $33\frac{13}{16}$″
J	= $29\frac{3}{8}$″	T	= $26\frac{3}{8}$″
K	= $44\frac{1}{4}$″		



2 x 2 — 8-Foot



2 x 2 — 5-Foot

X-RAY WALL RADIATOR

List of Sizes

Number of Sections Height	Number of Sections Length	5-Foot X-Ray Sq. Feet of Surface	5-Foot X-Ray Length Feet Inches	8-Foot X-Ray Sq. Feet of Surface	8-Foot X-Ray Length Feet Inches
1	1	5	1— 2 5/16	8	1— 2 5/16
1	2	10	2— 5 3/8	16	2— 5 3/8
1	3	15	3— 8 7/16	24	3— 8 7/16
1	4	20	4—11 1/2	32	4—11 1/2
1	5	25	6— 2 9/16	40	6— 2 9/16
1	6	30	7— 5 5/8	48	7— 5 5/8
1	7	35	8— 8 11/16	56	8— 8 11/16
1	8	40	9—11 3/4	64	9—11 3/4
		Height 1 ft. 2 5/16 in.		Height 1 ft. 9 3/4 in.	
2	1	10	1— 2 5/16	16	1— 2 5/16
2	2	20	2— 5 3/8	32	2— 5 3/8
2	3	30	3— 8 7/16	48	3— 8 7/16
2	4	40	4—11 1/2	64	4—11 1/2
2	5	50	6— 2 9/16	80	6— 2 9/16
2	6	60	7— 5 5/8	96	7— 5 5/8
2	7	70	8— 8 11/16	112	8— 8 11/16
2	8	80	9—11 3/4	128	9—11 3/4
		Height 2 ft. 5 3/8 in.		Height 3 ft. 8 1/4 in.	
3	1	15	1— 2 5/16	24	1— 2 5/16
3	2	30	2— 5 3/8	48	2— 5 3/8
3	3	45	3— 8 7/16	72	3— 8 7/16
3	4	60	4—11 1/2	96	4—11 1/2
3	5	75	6— 2 9/16	120	6— 2 9/16
3	6	90	7— 5 5/8	144	7— 5 5/8
3	7	105	8— 8 11/16	168	8— 8 11/16
3	8	120	9—11 3/4	192	9—11 3/4
		Height 3 ft. 8 7/16 in.		Height 5 ft. 6 3/4 in.	

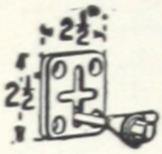
NOTE. — Radiators larger than six sections are *not* assembled.

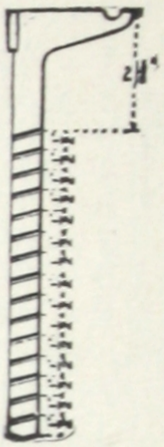
8-FOOT SECTION Radiators, longer than one section are NOT tapped to be used HORIZONTALLY.

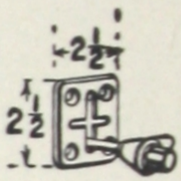
PRICE: 5-foot and 8-foot X-Ray
$0.42 per square foot

X-RAY WALL RADIATOR

Legs and Brackets



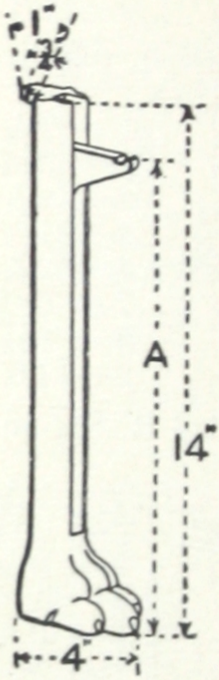




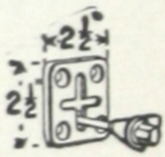
Reducible Bracket

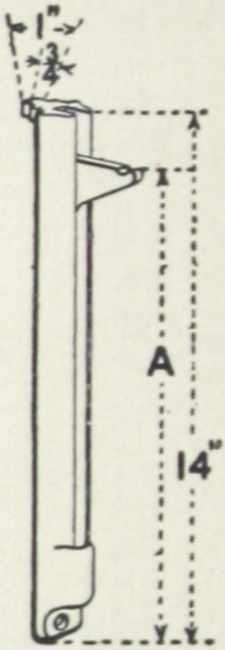
Used with No. 1 and No. 2 X-Ray Bracket

A=12½ inches
but can be reduced to 5 inches by cutting off the Reducible Bracket

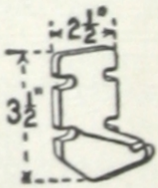


No. 1
Price $0.60
Complete



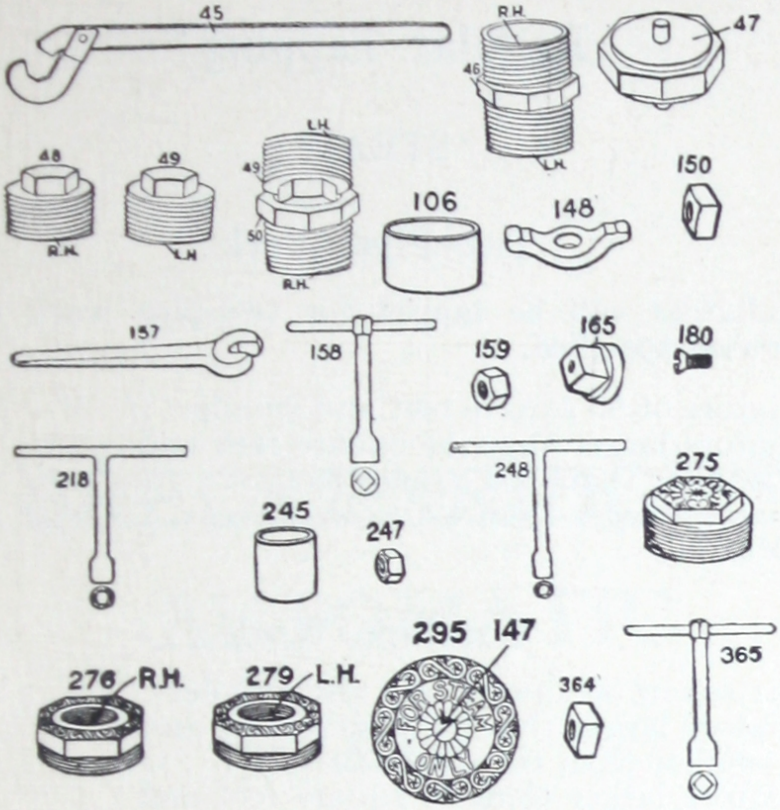


No. 2
Price $0.55
Complete



No. 3
Price $0.20
Complete

DIRECT RADIATOR FITTINGS



Price List

No.*	Name	Size	Net Price
45	X-Ray Wrench ..		$3.00
46	R. and L. Nipple ...	1½″	.10
47	Disk		.05
48	R.H. Male Plug	1½″	.05
49	L.H. Male Plug	1½″	.05
50	R.H. Female Plug.	1½″	.05
106	Push Nipple		.02½
148	Yoke.....		.02½
150	Nut.....	7/16″ Sq.	.00½
157	Wrench for nut No.159	⅜″ Hex.	.50
158	Wrench for nut No.150	7/16″ Sq.	1.25
159	Nut.....	⅜″ Hex.	.00½
165	Royal Steam Nut	⅜″ Sq.	.02½
180	Imperial Rosette Screw		.00½
218	Wrench for nut No. 159	⅜″ Hex.	$1.25
245	Sovereign top nipple.		.02½
247	Sovereign Nut.....	5/16″ Hex.	.00½
248	Wrench for nut No. 247	5/16″ Hex.	.75
275	Radiator Plug	2″	.05
276	Radiator Bushing R.H.	2″	.05
279	Radiator Bushing L.H.	2″	.05
295	Royal Rosette...		.02½
364	Nut.....	⅜″ Sq.	.00½
365	Wrench for nut No. 364	⅜″ Sq.	1.25

* Catalog number of part.

DIRECT RADIATORS

Regular Tapping *

STEAM

Two-Pipe Work

Radiators will be tapped for two-pipe work unless otherwise specified.

Radiators of 50 square feet and smaller .	1″ x ¾″
Radiators larger than 50 square feet and smaller than 120 square feet . . .	1¼″ x 1″
Radiators larger than 120 square feet .	1½″ x 1¼″
Air Valve	⅛″

One-Pipe Work

Radiators of 30 square feet and smaller	1″
Radiators larger than 30 square feet and smaller than 60 square feet	1¼″
Radiators larger than 60 square feet and smaller than 120 square feet	1½″
Radiators larger than 120 square feet	2″
Air Valve	⅛″

WATER

Radiators of 50 square feet and smaller .	1″ x 1″
Radiators larger than 50 square feet and smaller than 120 square feet . . .	1¼″ x 1¼″
Radiators larger than 120 square feet .	1½″ x 1½″
Air Valve	⅛″ at top

If radiators are required to be tapped top and bottom, same end, or top and bottom, opposite ends, so specify on order.

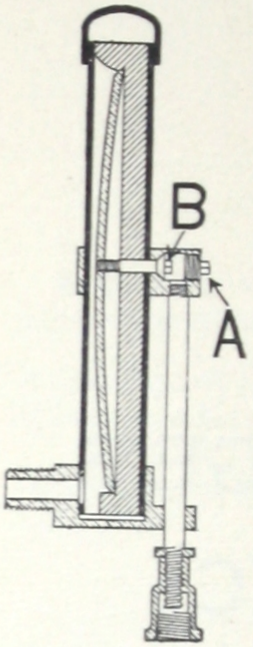
NOTE. — X-Ray (wall) Radiators cannot be tapped larger than 1½″.

All tappings are made RIGHT HAND unless otherwise specified.

* Tappings other than Regular can be made SPECIAL to order.

BRECKENRIDGE'S AUTOMATIC AIR VALVES

AUTOMATIC AIR VALVES



Sectional View

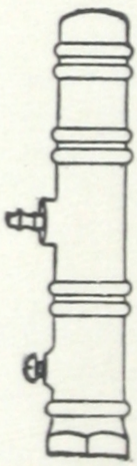
The cut opposite illustrates a sectional view of the No. 4 Valve, but also shows the Mechanical Construction of all Breckenridge Automatic Air Valves.

To Set Valve

Remove the plug and unscrew the valve so that the steam will flow out freely. After the valve has become thoroughly heated, close it lightly until the flow of steam stops (do not close the valve too hard on its seat), then screw in the plug, and the valve will require no further attention.

These directions apply to all of the valves except No. 1, which is to be set with thumbscrew instead of with key. Keys are furnished with valves.

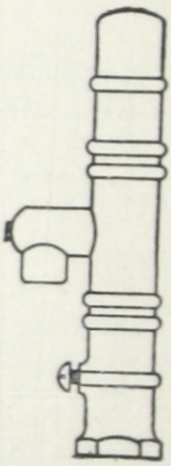
For Indirect Radiators



No. 1 Valve

Cast Iron—Finished Black
3/8" Connection

Price $0.70



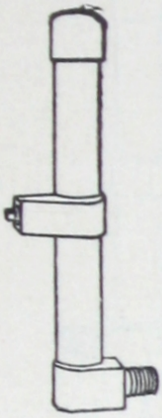
No. 2 Valve

Cast Iron—Finished Black
3/8" Connection 1/8" Drip

Price $0.80

AUTOMATIC AIR VALVES

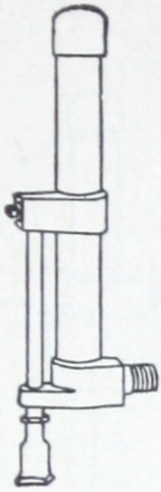
For Direct Radiators



No. 3 Valve

Brass—Nickel Plated
1/8" Connection

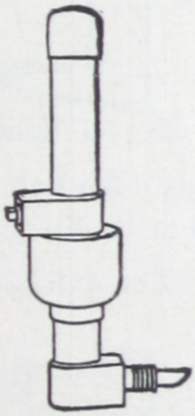
Price $1.00



No. 4 Valve

Brass—Nickel Plated
1/8" Connection, 1/8" Drip

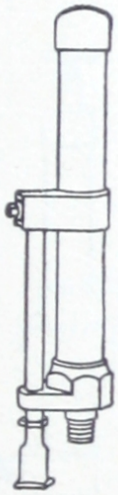
Price $1.25



No. 5 Valve

Brass—Nickel Plated
1/8" Connection

Price $1.25



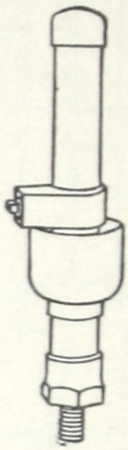
No. 6 Valve

Brass—Nickel Plated
1/8" Connection, 1/8" Drip

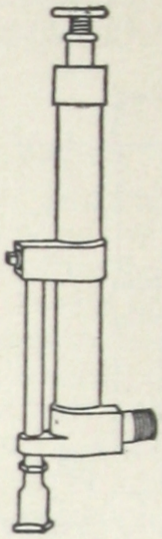
Price $1.25

AUTOMATIC AIR VALVES

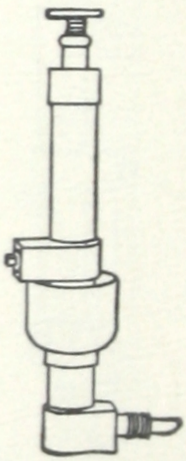
For Direct Radiators



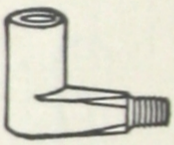
No. 7 Valve
Brass—Nickel Plated
1/8" Connection
Price $1.25



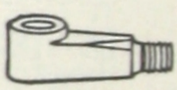
No. 8 Valve
Brass—Nickel Plated
1/8" Connection, 1/8" Drip
Price $1.50



No. 9 Valve
Brass—Nickel Plated
1/8" Connection
Price $1.50



No. 6 Elbow
Brass—Nickel Plated
Used with No. 6 Valve
Price $0.25



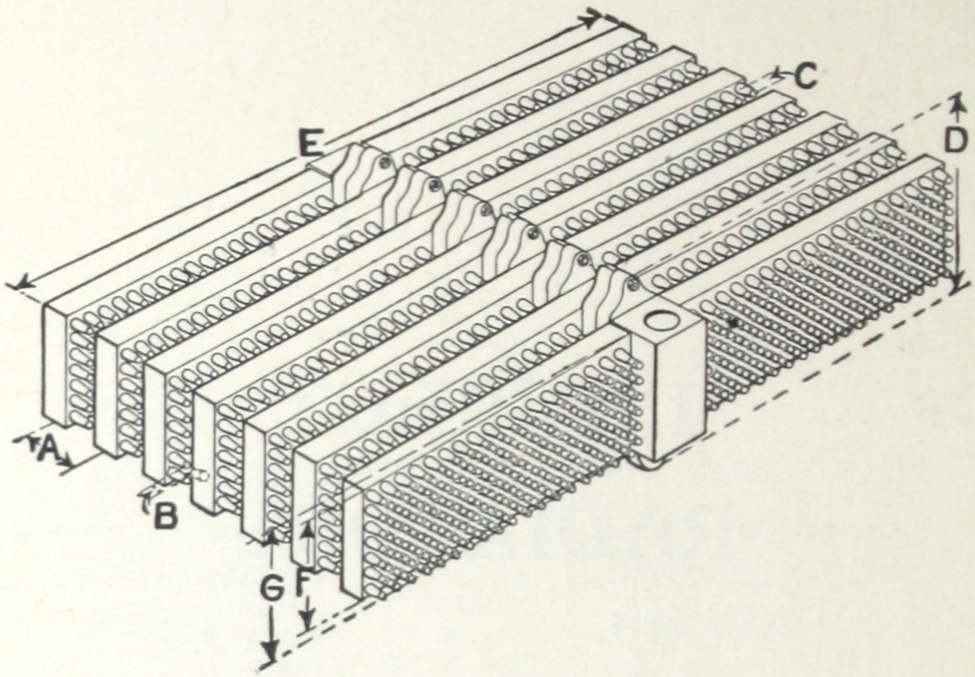
No. 7 Elbow
Brass—Nickel Plated
Used with No. 7 Valve
Price $0.25

INDIRECT RADIATORS

REGULAR PATTERN

GOLD PIN

Steam or Water



10 Square Feet per Section

Dimensions of Section

A	Distance from center to center	3¼″
B	Distance between ends of Pins	¼″
C	Length of Pin	¾″
D	Height of Flange	10¾″
E	Length of Section	40½″
F	Height of Section at end	6½″
G	Height of Section at center	7¼″

Shipping weight, per Section, 70 lbs.

Regular Tapping

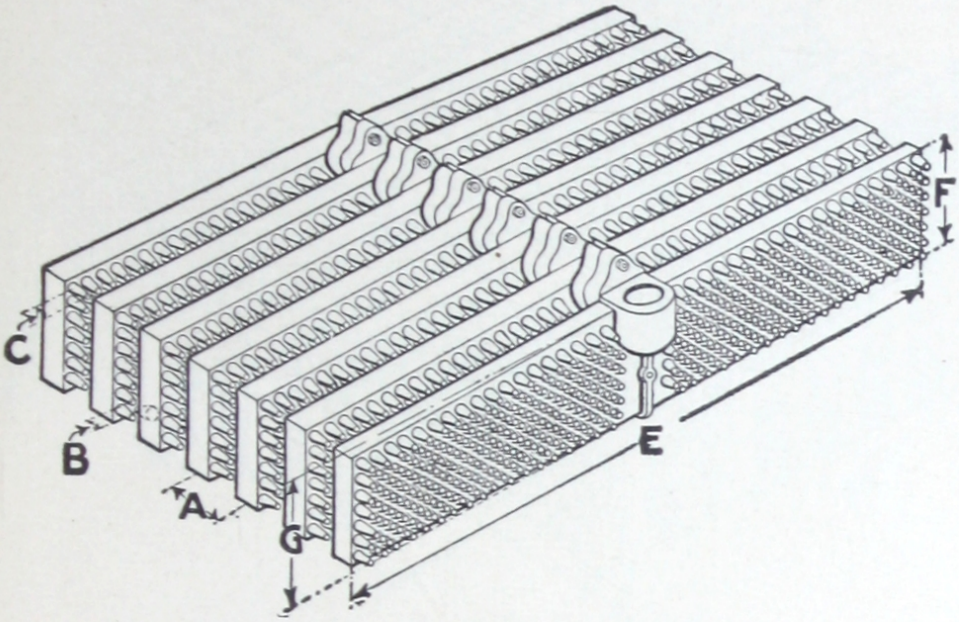
Supply . . . . . 1¼″ Return . . . . . 1¼″
Air Valve . . . . . ⅜″

Price $0.27 per Square Foot

TEN-INCH FLANGE

GOLD PIN

Steam or Water



15 Square Feet per Section

Dimensions of Section

A	Distance from center to center	3¼″
B	Distance between ends of Pins	¼″
C	Length of Pin	¾″
E	Length of Section	40½″
F	Height of Section at end	10¼″
G	Height of Section at center	10¾″

Shipping weight, per Section, 108 lbs.

Regular Tapping

Supply . . . . . 1½″ Return . . . . . 1½″

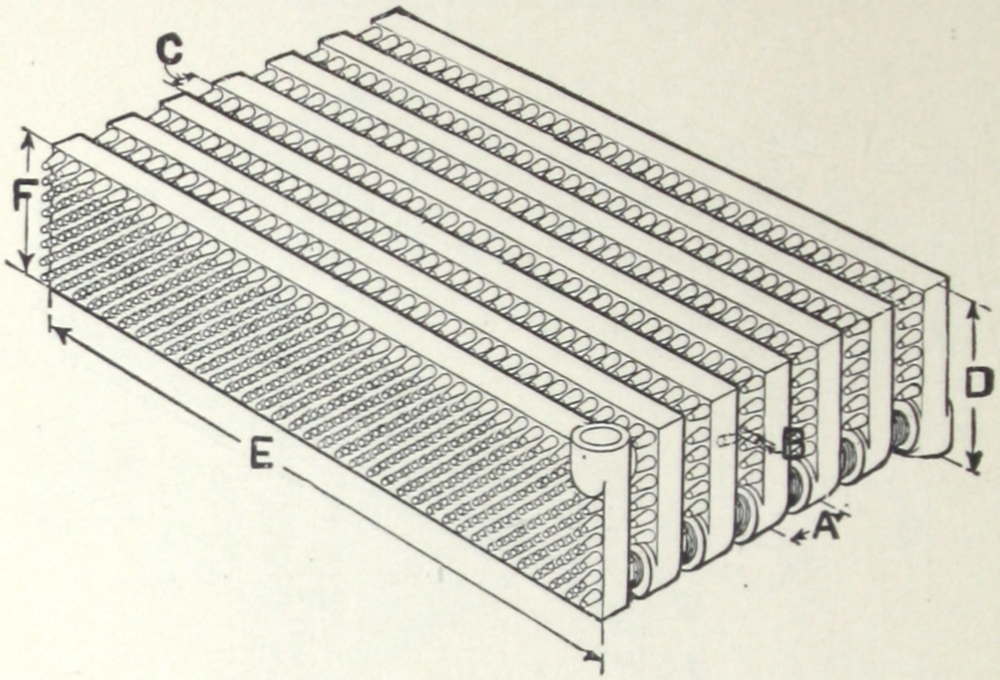
Air Valve . . . . . ⅜″

Price $0.27 per Square Foot

12-FOOT R. & L. NIPPLE

GOLD PIN

Steam Only



12 Square Feet per Section

Dimensions of Section

A	Distance from center to center	3 1/4"
B	Distance between ends of Pins	1/4"
C	Length of Pin	3/4"
D	Height of Section	9 "
E	Length of Section	36 "
F	Height of Section	8 1/2"
	Size of Right and Left Nipple	2 "

Shipping weight, per Section, 62 lbs.

Supply or Head Section is tapped L. H. for R. and L. Nipple
Return or Drain Section is tapped R. H. for R. and L. Nipple

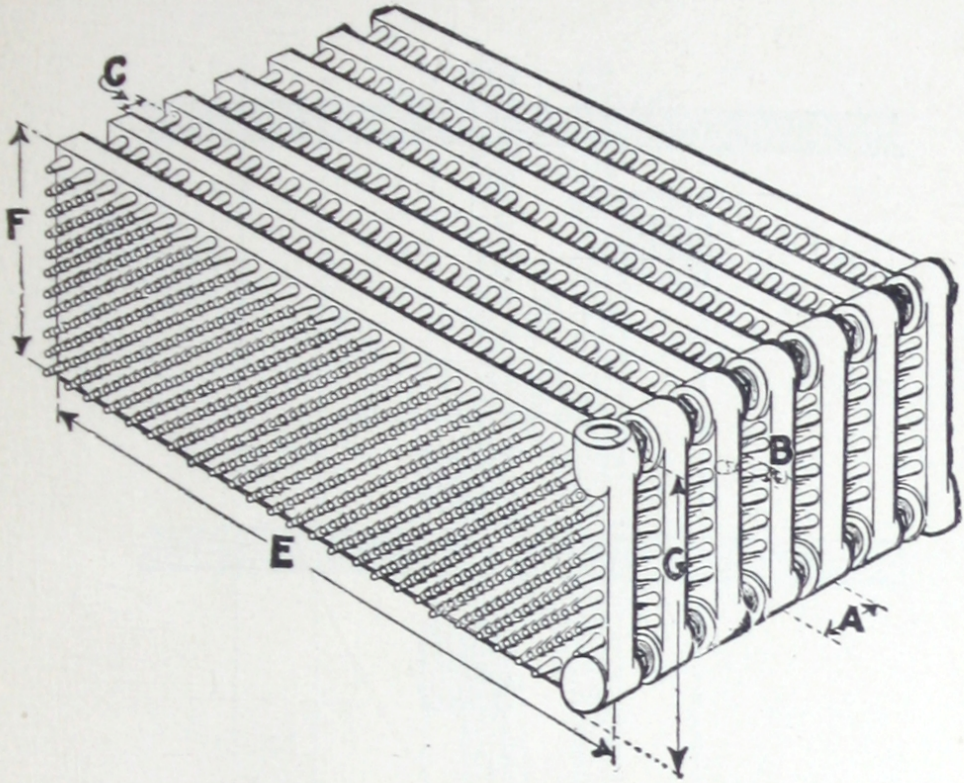
Regular Tapping

Supply . . . . . 1 1/2" Return . . . . . 1 1/4"
Air Valve . . . . . 3/8"

Price $0.27 per Square Foot

RIGHT AND LEFT NIPPLE GOLD PIN

Steam or Water



15-Foot R. & L. Nipple Gold Pin

F	Height of Section	10″
G	Height of Section	11½″

Shipping weight, per Section, 77 lbs.
15 Square Feet per Section

20-Foot R. & L. Nipple Gold Pin

F	Height of Section	14″
G	Height of Section	15½″

Shipping weight, per Section, 106 lbs.
20 Square Feet per Section

Dimensions Common to Both

A	Distance from center to center	3¼″
B	Distance between ends of Pins	¼″
C	Length of Pin	¾″
E	Length of Section	36″
	Size of R. & L. Nipple	2″

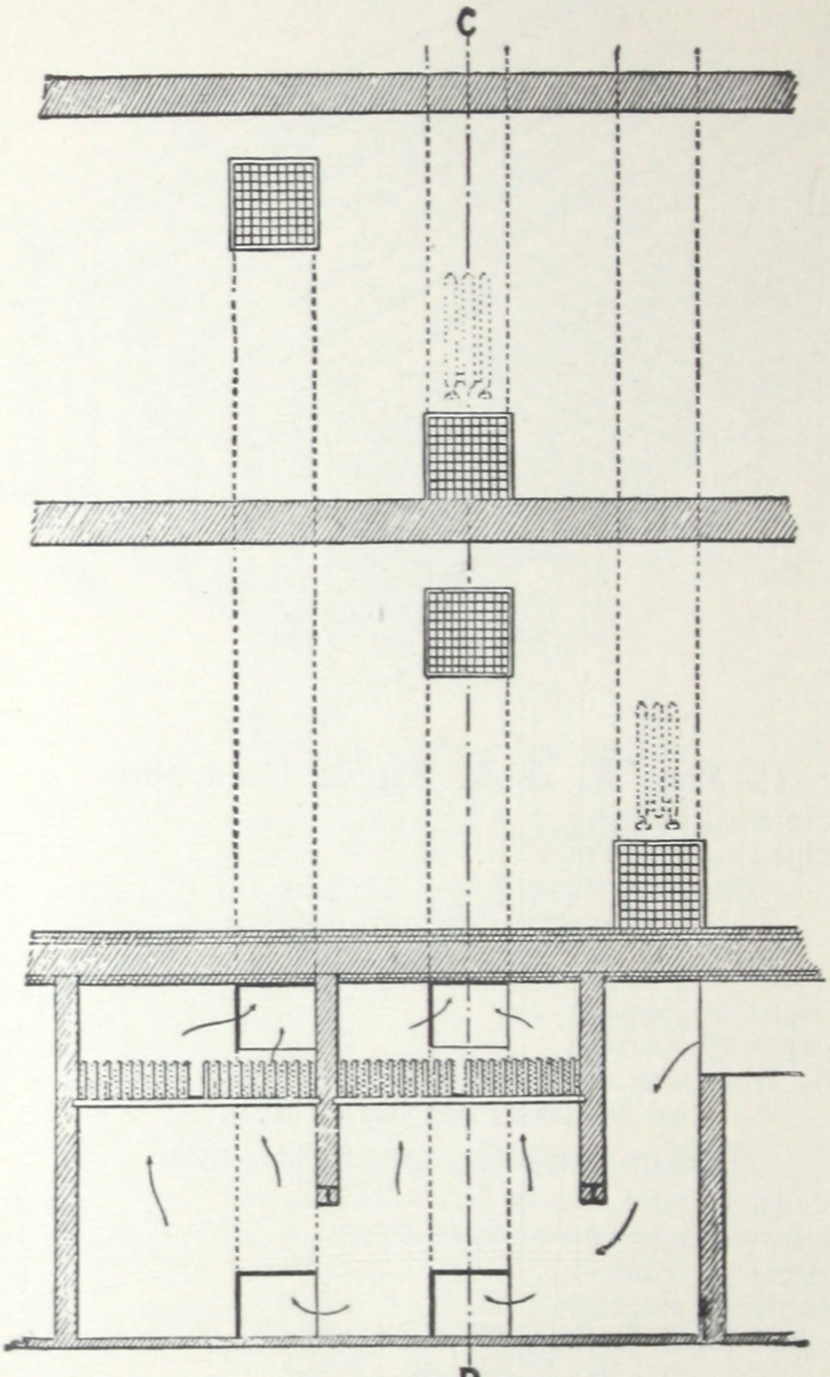
Regular Tapping

Supply . . 2″ Return . . 2″ Air Valve . . ⅜″

Supply or Head Section is tapped L.H. for R. & L. Nipple
Return or Drain Section is tapped R.H. for R. & L. Nipple

Price $0.27 per Square Foot

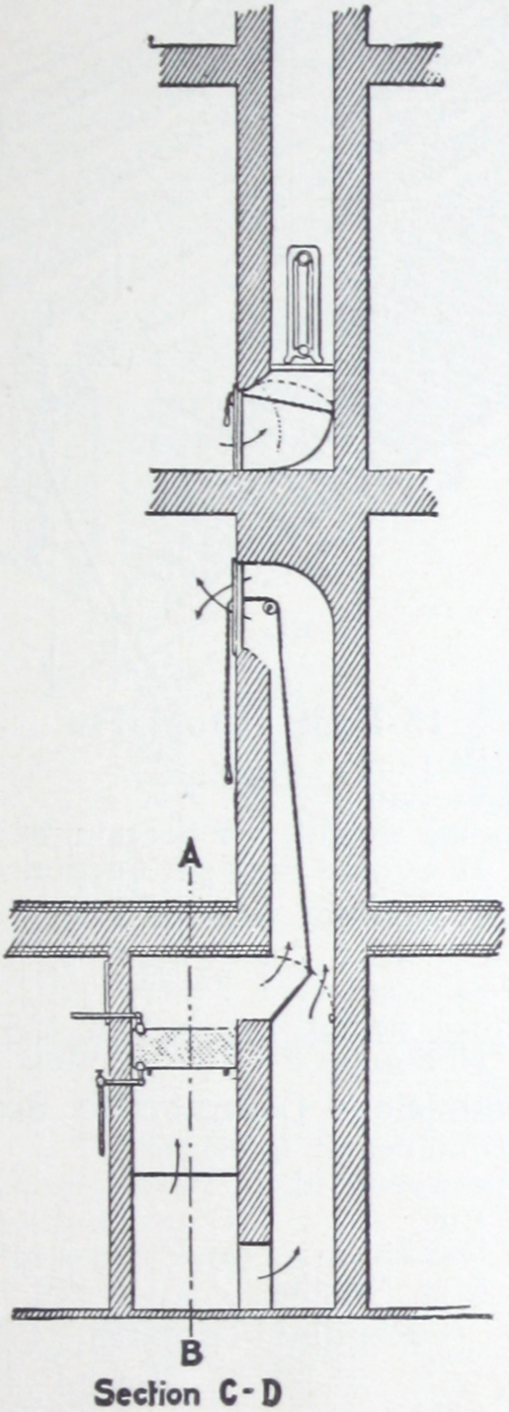
SCHOOL PIN



Section A-B

As used for warming and ventilating schoolhouses

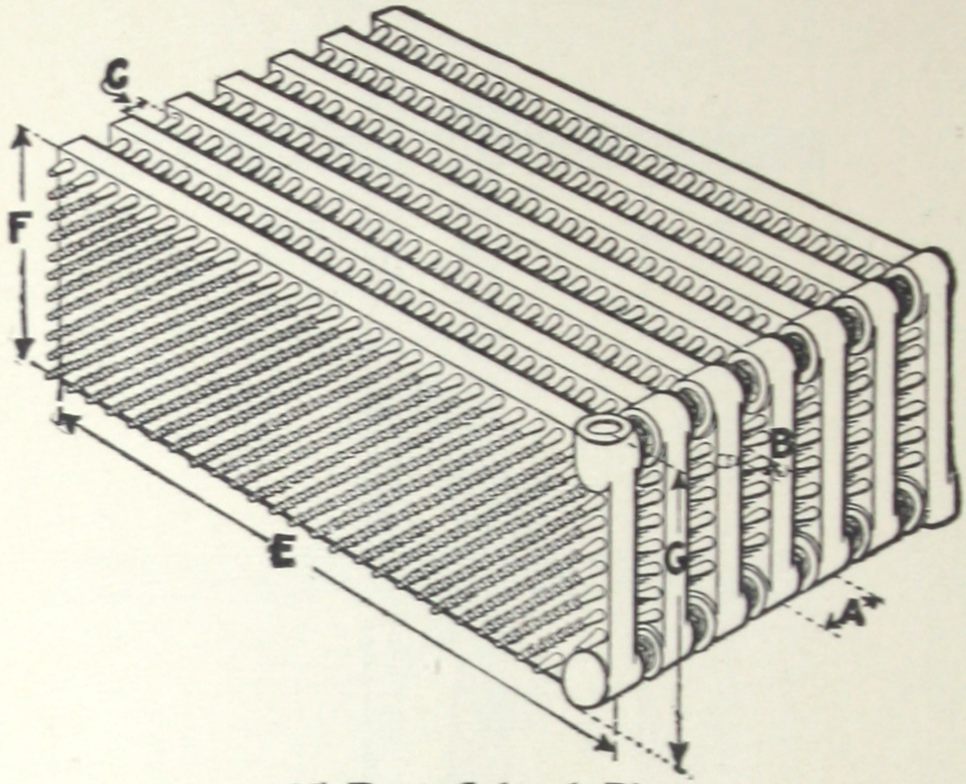
SCHOOL PIN



As used for warming and ventilating schoolhouses

SCHOOL PIN

Steam or Water



15-Foot School Pin

F	Height of Section	10″
G	Height of Section	11½″

Shipping weight, per Section, 82 lbs.
15 Square Feet per Section

20-Foot School Pin

F	Height of Section	14″
G	Height of Section	15½″

Shipping weight, per Section, 115 lbs.
20 Square Feet per Section

Dimensions Common to Both

A	Distance from center to center	4″
B	Distance between ends of Pins	½″
C	Length of Pin	1″
E	Length of Section	36″
	Size of R. & L. Nipple	2″

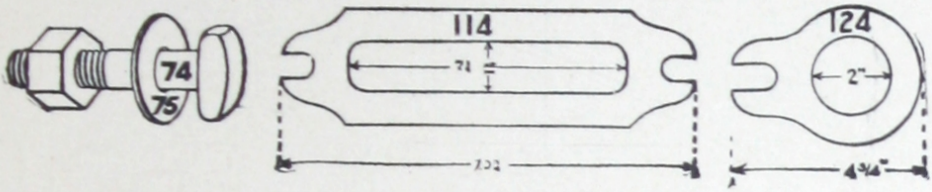
Regular Tapping

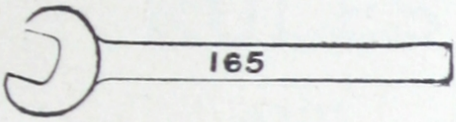
Supply . . . . . 2″ Return . . . . . 2″
Air Valve . . . . . ⅜″

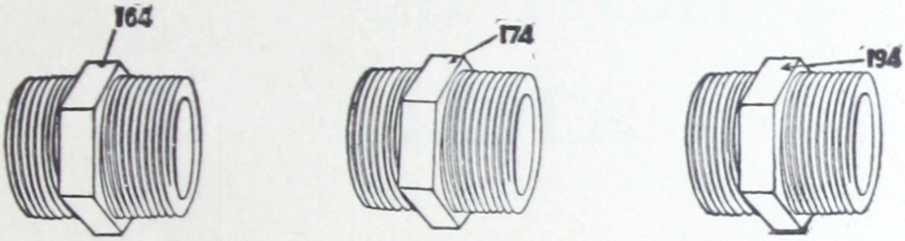
Supply or Head Section is tapped L.H. for R. & L. Nipple
Return or Drain Section is tapped R.H. for R. & L. Nipple

Price $0.27 per Square Foot

INDIRECT RADIATOR FITTINGS







Price List

No.*	Name	Size	Net Price
74	Bolt with Nut		$.02½
75	Washer for Bolt No. 74		.00½
114	Regular Pattern (paper) Gasket .		.01
124	10″ Flange Pin (paper) Gasket .		.01
164	R. & L. Nipple for 12-foot Gold Pin	2″ Hex.	.15
165	Wrench for 2″ R. & L. Nipple . .	2″ Hex.	1.25
174	R. & L. Nipple for School Pin . .	2″ Hex.	.15
194	R. & L. Nipple for 15- and 20-foot Gold Pin	2″ Hex.	.15

*Catalog number of part.

RULES
AND
PRACTICAL
DATA

WEIGHTS AND MEASURES

Measure of Length

4	In.	make	1 Hand.	3	Feet	make	1 Yard.
7.92	In.	"	1 Link.	5½	Yds.	"	1 Rod or Pole.
18	In.	"	1 Cubit.	40	Poles	"	1 Furlong.
12	In.	"	1 Foot.	8	Fur.	"	1 Mile.
6	Ft.	"	1 Fathom.	69⅙	Miles	"	1 Degree.

1 Degree contains 60 Geographical Miles.

1760 Yards, } 1 Mile.
5280 Feet, }

Measure of Surface

144	Square Inches	make	1 Square Foot.
9	Square Feet	"	1 Square Yard.
30¼	Square Yards	"	1 Rod, Perch or Pole.
40	Square Rods	"	1 Rood.
4	Roods	"	1 Acre.
10	Square Chains	"	1 Acre.
640	Acres	"	1 Square Mile.

Gunter's Chain equal to 22 Yards or 100 Links.
272¼ Square Feet make 1 Square Rod.
43,560 Square Feet make 1 Acre.

Measure of Capacity

1728 Cubic Inches make 1 Cubic Foot.
27 Cubic Feet " 1 Cubic Yard.

Avoirdupois Weight

27 11/32	Grains	make	1 Dram (dr.)
16	Drams	"	1 Ounce (oz.) or 473½ Grains.
16	Ounces	"	1 Pound (lb.) or 7000 Grains.
25	Pounds	"	1 Quarter (qr.)
4	Quarters	"	1 Hundred-Weight (cwt.)
20	Cwts.	"	1 Ton.
2240	Pounds	"	1 Gross Ton.

Liquid Measure

4 Gills	make	1 Pint.	31½ Gallons make 1 Barrel.
2 Pints	"	1 Quart.	54 Gallons " 1 Hhd.
4 Quarts	"	1 Gallon.	

Dry Measure

8 Quarts	make	1 Peck.	8 Bushels make 1 Quarter.
4 Pecks	"	1 Bushel.	36 Bushels " 1 Chaldron.

METRIC SYSTEM

Measures of Length

METRIC DENOMINATIONS		EQUIVALENTS
Myriameter,	10,000 Meters	6.2137 miles.
Kilometer,	1,000 "	0.62137 "
Hektometer,	100 "	328.092 feet.
Dekameter,	10 "	32.809 "
Meter,	1 "	3.2809 "
Decimeter,	1-10 "	3.937 inches.
Centimeter,	1-100 "	0.3937 "
Millimeter,	1-1000 "	.03937 "

Measures of Surface

METRIC DENOMINATIONS		EQUIVALENTS
Hectare,	10,000 Square Meters.	2.471 Acres.
Are,	100 " "	119.6 Square Yards.
Centare,	1 " "	10.7643 Square Feet.

Measures of Capacity

		EQUIVALENTS	
METRIC DENOMINATIONS		DRY MEASURE	WINE MEASURE
Kiloliter,	1,000 Liters.	1.308 Cubic Yards.	264.17 Gallons.
Hektoliter,	100 "	2. Bu. and 3.35 Pks.	26.417 "
Dekaliter,	10 "	9.08 Quarts.	2.6417 "
Liter,	1 "	0.908 "	1.0567 Quarts.
Deciliter,	1-10 "	6.1022 Cubic Inches.	0.845 Gill.
Centiliter,	1-100 "	0.6102 " "	.338 Fluid Oz.
Milliliter,	1-1000 "	.061 " "	.27 " Dr.

Weights

		EQUIVALENTS	
METRIC DENOMINATIONS		AVOIRDUPOIS WT.	QUANTITY OF WATER
Millier,	1,000,000 Grams.	2204.6 Lbs.	1 Cubic Meter.
Quintal,	100,000 "	220.46 "	1 Hektoliter.
Myriagram,	10,000 "	22.046 "	1 Dekaliter.
Kilogram,	1,000 "	2.2046 "	1 Liter.
Hektogram,	100 "	3.5274 Ozs.	1 Deciliter.
Dekagram,	10 "	.3527 "	1 Centiliter.
Gram,	1 "	15.432 Grs.	1 Milliliter.
Decigram,	1-10 "	1.5432 "	.1 "
Centigram	1-100 "	.1543 "	.01 "
Milligram,	1-1000 "	.0154 "	.001 "

AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
¼	.7854	.04909	19	59.6904	283.529
½	1.5708	.19635	½	61.2612	298.648
¾	2.3562	.44178	20	62.832	314.16
1	3.1416	.7854	½	64.4028	330.064
½	4.7124	1.7671	21	65.9736	346.361
2	6.2832	3.1416	½	67.5444	363.051
½	7.854	4.9087	22	69.1152	380.134
3	9.4248	7.0686	½	70.686	397.608
½	10.9956	9.6211	23	72.2568	415.477
4	12.5664	12.5664	½	73.8276	433.731
½	14.1372	15.9043	24	75.3984	452.39
5	15.708	19.635	½	76.9692	471.436
½	17.2788	23.7583	25	78.54	490.875
6	18.8496	28.2744	½	80.1108	510.706
½	20.4204	33.1831	26	81.6816	530.93
7	21.9912	38.4846	½	83.2524	551.547
½	23.562	44.1787	27	84.8232	572.557
8	25.1328	50.2656	½	86.394	593.958
½	26.7036	56.7451	28	87.9648	615.754
9	28.2744	63.6174	½	89.5356	637.941
½	29.8452	70.8823	29	91.1064	660.521
10	31.416	78.54	½	92.6772	683.494
½	32.9868	86.59	30	94.248	706.86
11	34.5576	95.0334	½	95.8188	730.618
½	36.1284	103.8691	31	97.3896	754.769
12	37.6992	113.098	½	98.9604	779.313
½	39.27	122.718	32	100.5312	804.25
13	40.8408	132.733	½	102.102	829.578
½	42.4116	143.139	33	103.673	855.301
14	43.9824	153.938	½	105.244	881.415
½	45.5532	165.13	34	106.814	907.922
15	47.124	176.715	½	108.385	934.822
½	48.6948	188.692	35	109.956	962.115
16	50.2656	201.062	½	111.527	989.8
½	51.8364	213.825	36	113.098	1017.878
17	53.4072	226.981	½	114.668	1046.349
½	54.978	240.528	37	116.239	1075.213
18	56.5488	254.467	½	117.81	1104.469
½	58.1196	268.803	38	119.381	1134.118

AREAS AND CIRCUMFERENCES OF CIRCLES

Diam.	Circum.	Area	Diam.	Circum.	Area
38½	120.952	1164.159	57	179.071	2551.76
39	122.522	1194.593	½	180.642	2596.73
½	124.093	1225.42	58	182.213	2642.09
40	125.664	1256.64	½	183.784	2687.84
½	127.235	1288.25	59	185.354	2733.98
41	128.806	1320.26	½	186.925	2780.51
½	130.376	1352.65	60	188.496	2827.44
42	131.947	1385.44	½	190.067	2874.76
½	133.518	1418.63	61	191.638	2922.47
43	135.089	1452.21	½	193.208	2970.58
½	136.66	1486.17	62	194.779	3019.08
44	138.23	1520.53	½	196.35	3067.97
½	139.801	1555.28	63	197.921	3117.25
45	141.372	1590.43	½	199.492	3166.93
½	142.943	1625.97	64	201.062	3217.
46	144.514	1661.91	½	202.633	3267.46
½	146.084	1698.23	65	204.204	3318.31
47	147.655	1734.95	½	205.775	3369.56
½	149.226	1772.05	66	207.346	3421.2
48	150.797	1809.56	½	208.916	3473.24
½	152.368	1847.45	67	210.487	3525.66
49	153.938	1885.74	½	212.058	3578.48
½	155.509	1924.42	68	213.629	3631.69
50	157.08	1963.5	½	215.2	3685.29
½	158.651	2002.97	69	216.77	3739.29
51	160.222	2042.82	½	218.341	3793.68
½	161.792	2083.08	70	219.912	3848.46
52	163.363	2123.72	½	221.483	3903.63
½	164.934	2164.76	71	223.054	3959.2
53	166.505	2206.19	½	224.624	4015.16
½	168.076	2248.01	72	226.195	4071.51
54	169.646	2290.23	½	227.766	4128.26
½	171.217	2332.83	73	229.337	4185.4
55	172.788	2375.83	½	230.908	4242.93
½	174.359	2419.22	74	232.478	4300.85
56	175.93	2463.01	½	234.049	4359.17
½	177.5	2507.19	75	235.62	4417.87

RELATIVE PROPORTIONS OF A WARMING APPARATUS

Sq. Ft. of Heating Surface	Sq. Ft. of Grate Surface	Size of Flue, Square Inches	Sq. Ft. of Radiation	Surface to Contents		
				1.50	1.70	1.90
67	3.5	96	400	20,000	28,000	36,000
83	4.	96	500	25,000	35,000	45,000
116	5.8	96	700	35,000	49,000	63,000
167	8.3	110	1,000	50,000	70,000	90,000
250	12.5	150	1,500	75,000	105,000	135,000
333	16.5	195	2,000	100,000	140,000	180,000
416	15.5	248	2,500	125,000	175,000	225,000
500	18.6	300	3,000	150,000	210,000	270,000
584	21.6	348	3,500	175,000	245,000	315,000
666	24.5	398	4,000	200,000	280,000	360,000
750	27.5	445	4,500	225,000	315,000	405,000
834	26.	485	5,000	250,000	350,000	450,000
916	28.5	530	5,500	275,000	385,000	495,000
1,000	31.	575	6,000	300,000	420,000	540,000
1,083	33.5	620	6,500	325,000	455,000	585,000
1,167	36.	665	7,000	350,000	490,000	630,000
1,250	38.5	715	7,500	375,000	525,000	675,000
1,333	41.	760	8,000	400,000	560,000	720,000
1,416	43.5	810	8,500	425,000	595,000	765,000
1,500	45.5	860	9,000	450,000	630,000	810,000
1,583	48.	910	9,500	475,000	665,000	855,000
1,666	50.	955	10,000	500,000	700,000	900,000

This table is intended to show the existing relations between the different parts of a plant for warming. It will be understood that the figures in the above are not intended to indicate a fixed and unvarying relation existing between any two parts, but are meant to approximate such proportions as will occur in an average job working under average conditions.

WROUGHT IRON WELDED PIPE

Dimensions, Weights, etc., of Standard Sizes for Steam, Gas, Water, Oil, etc.

Inside Diameter Inches	Outside Diameter Inches	External Circumference Inches	Length of Pipe per Sq. Ft. of Outside Surface Feet	Internal Area Inches	External Area Inches	Length of Pipe Containing One Cubic Foot Feet	Weight per Foot of Length Lbs.	No. of Threads per Inch of Screw	Contents in *Gallons per Foot	Weights of Water per Foot of Length Lbs.
⅛	.40	1.272	9.44	.012	.129	2500.	.24	27	.0006	.005
¼	.54	1.696	7.075	.049	.229	1385.	.42	18	.0026	.021
⅜	.67	2.121	5.657	.110	.358	751.5	.56	14	.0057	.047
½	.84	2.652	4.502	.196	.554	472.4	.84	14	.0102	.085
¾	1.05	3.299	3.637	.441	.866	270.	1.12	11½	.0230	.190
1	1.31	4.134	2.903	.785	1.357	166.9	1.67	11½	.0408	.349
1¼	1.66	5.215	2.301	1.227	2.164	96.25	2.25	11½	.0638	.527
1½	1.9	5.969	2.01	1.767	2.835	70.65	2.69	11½	.0918	.760
2	2.37	7.461	1.611	3.141	4.430	42.36	3.66	11½	.1632	1.356
2½	2.87	9.032	1.328	4.908	6.491	30.11	5.77	8	.2550	2.116
3	3.5	10.996	1.091	7.068	9.621	19.49	7.54	8	.3673	3.049
3½	4.	12.566	.955	9.621	12.566	14.56	9.05	8	.4998	4.155
4	4.5	14.137	.849	12.566	15.904	11.31	10.72	8	.6528	5.405
4½	5.	15.708	.765	15.904	19.635	9.03	12.49	8	.8263	6.851
5	5.56	17.475	.629	19.635	24.299	7.20	14.56	8	1.020	° 500
6	6.62	20.813	.577	28.274	34.471	4.98	18.76	8	1.469	12.312
7	7.62	23.954	.505	38.484	45.663	3.72	23.41	8	1.999	16.662
8	8.62	27.096	.444	50.265	58.426	2.88	28.34	8	2.611	21.750
9	9.68	30.433	.394	63.617	73.715	2.26	34.67	8	3.300	27.500
10	10.75	33.772	.355	78.540	90.792	1.80	40.64	8	4.081	34.000

* The Standard U.S. gallon of 231 cubic inches.

TABLE OF EXPANSION OF WROUGHT IRON PIPE

Temperature of the Air when the Pipe is fitted Deg. Fahr.	Length of Pipe when fitted Feet	Length of Pipe when Heated to							
		215 Degrees		265 Degrees		297 Degrees		338 Degrees	
		Feet	In.	Feet	In.	Feet	In.	Feet	In.
0	100	100	1.72	100	2.12	100	2.31	100	2.70
32	100	100	1.47	100	1.78	100	2.12	100	2.45
64	100	100	1.21	100	1.61	100	1.87	100	2.19

Registers

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
6 x 10..	40	10 x 14..	 93	20 x 20..	267
8 x 10..	53	10 x 16..	107	20 x 24..	320
8 x 12—	——64	12 x 15—	——120	20 x 26—	——347
8 x 15..	80	12 x 19..	152	21 x 29..	406
9 x 12..	72	14 x 22..	205	27 x 27..	486
9 x 14—	——84	15 x 25—	——250	27 x 38—	——684
10 x 12..	80	16 x 24..	256	30 x 30..	600

Round Registers

Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches	Size of Opening	Capacity in Sq. Inches
7 in..	26	12 in...	 75	20 in...	209
8 " ..	33	14 " ...	103	24 " ...	301
9 " ..	42	16 " ...	134	30 " ...	471
10 " ..	52	18 " ...	169	36 " ...	679

IRON PIPE SIZES OF BRASS PIPE

Made to Correspond with Iron Tubes and Fit Iron Tube Fittings

List of Sizes, Lengths, etc.

Outside Diameter	Same as Iron Size	Weight per Foot — Brass	Weight per Foot — Copper
13/32 In.	1/8 In.	.30 Pounds	.31 Pounds
9/16 "	1/4 "	.43 "	.45 "
11/16 "	3/8 "	.58 "	.61 "
13/16 "	1/2 "	.80 "	.84 "
1 1/16 "	3/4 "	1.17 "	1.23 "
1 5/16 "	1 "	1.67 "	1.75 "
1 5/8 "	1 1/4 "	2.42 "	2.54 "
1 7/8 "	1 1/2 "	2.92 "	3.07 "
2 3/8 "	2 "	4.17 "	4.38 "
2 7/8 "	2 1/2 "	5. "	5.25 "
3 1/2 "	3 "	8. "	8.40 "
4 "	3 1/2 "	10. "	10.50 "
4 1/2 "	4 "	12. "	12.00 "

TABLE OF DECIMAL EQUIVALENTS

Of 8ths, 16ths, 32ds and 64ths of an Inch

8ths	32ds	64ths	64ths
1/8 = .125	1/32 = .03125	1/64 = .015625	33/64 = .515625
1/4 = .250	3/32 = .09375	3/64 = .046875	35/64 = .546875
3/8 = .375	5/32 = .15625	5/64 = .078125	37/64 = .578125
1/2 = .500	7/32 = .21875	7/64 = .109375	39/64 = .609375
5/8 = .625	9/32 = .28125	9/64 = .140625	41/64 = .640625
3/4 = .750	11/32 = .34375	11/64 = .171875	43/64 = .671875
7/8 = .875	13/32 = .40625	13/64 = .203125	45/64 = .703125
	15/32 = .46875	15/64 = .234375	47/64 = .734375
16ths	17/32 = .53125	17/64 = .265625	49/64 = .765625
1/16 = .0625	19/32 = .59375	19/64 = .296875	51/64 = .796875
3/16 = .1875	21/32 = .65625	21/64 = .328125	53/64 = .828125
5/16 = .3125	23/32 = .71875	23/64 = .359375	55/64 = .859375
7/16 = .4375	25/32 = .78125	25/64 = .390625	57/64 = .890625
9/16 = .5625	27/32 = .84375	27/64 = .421875	59/64 = .921875
11/16 = .6875	29/32 = .90625	29/64 = .453125	61/64 = .953125
13/16 = .8125	31/32 = .96875	31/64 = .484375	63/64 = .984375
15/16 = .9375			

THE MOVEMENT OF WARM AIR IN FLUES

The power that causes the upward motion of heated air in flues is relatively small, being merely the difference in weight between equal columns of air at different temperatures. The colder air forces the warmer column upward with a force proportionate to this difference in weight, and with a velocity equal to that acquired by a body falling through a space equal to the difference in height that would be occupied by two columns of equal weight but of different temperatures.

According to the known law of gravitation, the velocity will be approximately equal to eight times the square root of the height of descent in decimals of a foot. The discharge of air under the above conditions, however, is subject to certain corrections for friction, etc., and in general practice a deduction of one-fourth is made to represent the true rate of discharge.

Opposite are two tables, the first showing the discharge of air from a flue one foot cross section and one foot high, for given differences in temperature, with corrections for friction. The second table shows the square root of different heights of flues, and is a multiplier for the first table. Combining the two tables to meet existing conditions the total discharge of air from any flue may be estimated.

For example: What is the discharge of air from a flue 15 feet high, with an area of 2 square feet, when the inside temperature is 72° and the outside temperature is 42° Fahrenheit? The difference of temperature between the air in the flue and that outside is 30°, and by reference to table No. 1, we find that the discharge of air from a flue 1 foot high, and 1 square foot cross section, for this difference in temperature is 88 cubic feet per minute. Multiplying this by 2 feet, the area of the flue in question, and by the square root of 15 (table No. 2) for the height, we get 681.12, which is the discharge per minute in cubic feet, under the above conditions.

* TABLE No. 1

The discharge of air per minute from a flue one square foot in section and one foot high at different temperatures

Excess of Temperature of Air in Flue over Outside Air

Temperature of Outside Air	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°
0°	38	53	65	76	84	92	100	106	113	119	125	130	136	141	145
12°	37	53	63	75	83	91	98	105	111	118	124	128	134	139	144
22°	37	52	62	74	82	90	97	104	110	117	122	127	132	137	142
32°	36	51	62	73	81	89	96	103	109	115	120	126	131	136	141
42°	36	51	62	72	80	88	95	102	108	114	119	125	130	135	140
52°	36	50	62	71	80	87	94	101	107	113	118	124	129	134	139
62°	35	50	61	71	79	86	93	100	106	112	117	123	127	133	137
72°	35	49	61	70	78	85	92	99	105	111	116	121	126	131	136
82°	35	49	60	69	77	85	91	98	104	110	115	120	125	130	134
92°	34	48	60	69	77	84	90	97	103	109	114	119	124	128	133
102°	34	48	59	68	76	83	90	96	102	108	113	118	123	127	131

* TABLE No. 2

Square Roots of Heights of Flues. (Multipliers for above Table)

Column H = Height of Flue in Feet	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$	H	$\sqrt{H}$
	1	1	10	3.16	19	4.36	28	5.29	37	6.08	46	6.78	55	7.42	64	8
	2	1.41	11	3.32	20	4.47	29	5.39	38	6.16	47	6.86	56	7.48	65	8.06
	3	1.73	12	3.46	21	4.58	30	5.48	39	6.24	48	6.93	57	7.55	66	8.12
	4	2	13	3.61	22	4.69	31	5.57	40	6.32	49	7	58	7.62	67	8.19
	5	2.24	14	3.74	23	4.80	32	5.66	41	6.4	50	7.07	59	7.68	68	8.25
	6	2.45	15	3.87	24	4.90	33	5.74	42	6.48	51	7.14	60	7.75	69	8.31
	7	2.65	16	4	25	5	34	5.83	43	6.56	52	7.21	61	7.81	70	8.37
	8	2.83	17	4.12	26	5.10	35	5.92	44	6.63	53	7.28	62	7.87	71	8.43
	9	3	18	4.24	27	5.2	36	6	45	6.71	54	7.35	63	7.94	72	8.49

* " Heat for the Warming and Ventilation of Buildings," by J. H. Mills.

TEMPERATURE AND VOLUME OF STEAM

At Different Pressures

Pressure in Pounds		Temperature in Fahrenheit Degrees	Volume	
By Steam Gauge	Above Vacuum		Compared with Water	Cubic Feet of Steam from 1 lb. of Water
0	15	212.0	1642	26.36
5	20	228.0	1299	19.72
10	25	240.1	996	15.99
15	30	250.4	838	13.46
20	35	259.3	726	11.65
25	40	267.3	640	10.27
30	45	274.4	572	9.18
35	50	281.0	518	8.31
40	55	287.1	474	7.61
45	60	292.7	437	7.01
50	65	298.0	405	6.49
55	70	302.9	378	6.07
60	75	307.5	353	5.68
65	80	312.0	333	5.35
70	85	316.1	314	5.05
75	90	320.2	298	4.79
80	95	324.1	283	4.55
85	100	327.9	270	4.33
90	105	331.3	257	4.14
95	110	334.6	247	3.97
100	115	338.0	237	3.80
110	125	344.2	219	3.51
120	135	350.1	203	3.27
130	145	355.6	190	3.06
140	155	361.0	179	2.87
150	165	366.0	169	2.71

Table of Temperature, Specific Gravity and Weight of Water, also Pressure due to Different Heights in Feet

Temperature	Specific Gravity	Height in Feet	Pounds Pressure	Temperature	Specific Gravity	Height in Feet	Pounds Pressure
20	.99880	1	.43	132	.9850	90	39.00
30	.99962	2	.86	142	.9822	100	43.31
40	1.00000	5	2.16	152	.9792	110	47.63
42	.99997	10	4.33	162	.9761	120	51.97
52	.99950	15	6.49	172	.9729	130	56.29
62	.9986	20	8.66	182	.9694	140	60.63
72	.9974	25	10.82	192	.9659	150	64.96
82	.9959	40	17.32	202	.9622	160	69.11
92	.9941	50	21.65	212	.9585	170	73.46
102	.9921	60	25.80	230	.9513	180	77.95
112	.9900	70	30.15	250	.9430	190	82.81
122	.9875	80	34.65	275	.9321	200	96.62

HEAT UNITS IN WATER

Between 32° and 212° Fahrenheit, and Weight of Water per Cubic Foot

Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot	Temperature Degrees F.	Heat Units	Weight in Pounds per Cubic Foot
32	0.	62.42	123	91.16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138.45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24.01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.52	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103.22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61 45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60.41
80	48.04	62.23	142	110.26	61.34	187	155.61	60.39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62.11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61.97	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61.92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61.00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60.94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60.90	209	177.86	59.84
120	88.15	61.74	165	133.41	60.87	210	178.87	59.82
121	89.15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

VOLUME AND WEIGHT OF AIR

And Weight of Vapor in Saturated Air

Temperature	Volume	Number of Cubic Feet to 1 Pound	Weight of 1000 Cu. Feet Dry Air	Tension of Vapor	Weight of Vapor Saturated in 1000 Cu. Feet	Weight of Air Displaced by Vapor
0	0.9340	11.460	87.260	0.04379	0.07930	0.1264
5	0.9449	11.591	86.289	0.05747	0.10289	0.1646
10	0.9551	11.726	85.251	0.07116	0.12588	0.2014
15	0.9653	11.869	84.317	0.08535	0.14932	0.2389
20	0.9755	11.992	83.403	0.10748	0.18180	0.2909
25	0.9857	12.125	82.440	0.13367	0.22871	0.3661
30	0.9959	12.258	81.566	0.16581	0.27491	0.4398
32	1.0000	12.311	81.235	0.17989	0.29633	0.4741
36	1.0082	12.417	80.515	0.21066	0.35201	0.5632
40	1.0163	12.523	79.872	0.24604	0.40770	0.6523
44	1.0244	12.629	79.176	0.28647	0.47070	0.7531
48	1.0326	12.735	78.493	0.33284	0.54204	0.8672
52	1.0408	12.841	77.825	0.38574	0.62282	0.9965
56	1.0489	12.947	77.220	0.44352	0.71063	1.1370
60	1.0571	13.053	76.628	0.51683	0.82173	1.3147
64	1.0652	13.159	75.988	0.59229	0.93390	1.4943
68	1.0734	13.265	75.357	0.67994	1.0631	1.7008
72	1.0816	13.371	74.794	0.78018	1.21050	1.9368
76	1.0897	13.477	74.184	0.89103	1.31715	2.1076
80	1.0979	13.583	73.638	1.01669	1.5540	2.4864
84	1.1060	13.689	73.046	1.15705	1.7536	2.8058
88	1.1142	13.795	72.464	1.31554	1.9772	3.1635
92	1.1223	13.901	71.942	1.49067	2.2257	3.5611
96	1.1305	14.007	71.377	1.69214	2.5060	4.0096
100	1.1387	14.113	70.872	1.91937	2.8220	4.5152
104	1.1468	14.219	70.323	2.14669	3.133	5.0138
108	1.1550	14.325	69.784	2.43323	3.523	5.6368
112	1.1631	14.431	69.300	2.72984	3.926	6.2826
116	1.1713	14.537	68.776	3.05954	4.367	6.9882
120	1.1794	14.643	68.306	3.41728	4.843	7.7488
124	1.1876	14.749	67.797	3.81775	5.371	8.5940
128	1.1957	14.855	67.295	4.26073	6.088	9.7430
132	1.2039	14.961	66.845	4.72888	6.559	10.4950
136	1.2121	15.067	66.357	5.25807	7.240	11.584
140	1.2202	15.173	65.919	5.81736	7.957	12.731
144	1.2284	15.279	65.442	6.48029	8.800	14.048
148	1.2365	15.385	64.977	7.14323	9.630	15.408
152	1.2447	15.491	64.568	7.9104	10.595	16.952
156	1.2528	15.597	64.102	8.6923	11.566	18.506
160	1.2610	15.703	63.694	9.5948	12.681	20.290
164	1.2691	15.809	63.251	10.5579	13.828	22.125
168	1.2773	15.915	62.814	11.4673	14.950	23.920
172	1.2855	16.021	62.422	12.7165	16.47	26.36
176	1.2936	16.127	61.996	13.8657	17.43	27.89
180	1.3018	16.233	61.614	15.2343	19.47	31.96
184	1.3099	16.339	61.200	16.6030	21.08	33.73
188	1.3181	16.445	60.790	18.1447	22.89	36.63
192	1.3262	16.551	60.423	19.7441	24.75	39.60
196	1.3344	16.657	60.024	21.4297	26.69	42.71
200	1.3426	16.763	59.666	23.2962	28.85	46.16

GALVANIZED SHEET IRON

Sizes and Weights

Gauge	Size	Ounces per Sq. Ft.	Weight of Sheet in Lbs.	Gauge	Size	Ounces per Sq. Ft.	Weight of Sheet in Lbs.
14	24 x 84	52½	46	23	36 x 84	20½	27
14	26 x 84	52½	49¼	23	40 x 84	20½	20
14	28 x 84	52½	53¾	23	24 x 96	20½	20½
14	30 x 84	52½	57½	23	26 x 96	20½	22¼
16	24 x 84	42½	37	23	28 x 96	20½	24
16	26 x 84	42½	40¼	23	30 x 96	20½	25¾
16	28 x 84	42½	43½	23	32 x 96	20½	27½
16	30 x 84	42½	46½	23	36 x 96	20½	31
16	24 x 96	42½	42⅓	23	40 x 96	20½	34⅓
16	26 x 96	42½	46	23	44 x 96	20½	37¾
16	28 x 96	42½	49¾	24	24 x 84	18½	16¼
16	30 x 96	42½	53	24	26 x 84	18½	17
18	24 x 84	34½	30¼	24	28 x 84	18½	19
18	26 x 84	34½	32	24	30 x 84	18½	20¼
18	28 x 84	34½	35¼	24	32 x 84	18½	22
18	30 x 84	34½	37¾	24	36 x 84	18½	24
18	36 x 84	34½	45¼	24	40 x 84	18½	27
18	24 x 96	34½	34¾	24	24 x 96	18½	18½
18	26 x 96	34½	36½	24	26 x 96	18½	20
18	28 x 96	34½	40⅓	24	28 x 96	18½	21¾
18	30 x 96	34½	42¼	24	30 x 96	18½	23
18	36 x 96	34½	51¾	24	32 x 96	18½	24¾
19	28 x 84	30½	31	24	36 x 96	18½	27¾
20	24 x 84	26½	23	24	40 x 96	18½	31
20	26 x 84	26½	25	24	44 x 96	18½	34
20	28 x 84	26½	27	26	24 x 84	14½	12¾
20	30 x 84	26½	29	26	26 x 84	14½	13¾
20	36 x 84	26½	34¾	26	28 x 84	14½	14¾
20	24 x 96	26½	26⅓	26	30 x 84	14½	16
20	26 x 96	26½	28¾	26	32 x 84	14½	17
20	28 x 96	26½	31	26	36 x 84	14½	19
20	30 x 96	26½	33	26	24 x 96	14½	14¼
20	36 x 96	26½	42	26	26 x 96	14½	15¾
22	24 x 84	22½	19¾	26	28 x 96	14½	17
22	26 x 84	22½	21¼	26	30 x 96	14½	18¼
22	28 x 84	22½	23	26	32 x 96	14½	19½
22	30 x 84	22½	24½	26	36 x 96	14½	21¾
22	36 x 84	22½	29½	28	24 x 84	12½	11
22	40 x 84	22½	33	28	26 x 84	12½	11¾
22	24 x 96	22½	22	28	28 x 84	12½	12¾
22	26 x 96	22½	24¼	28	30 x 84	12½	13¾
22	28 x 96	22½	26⅓	28	32 x 84	12½	14½
22	30 x 96	22½	28	28	36 x 84	12½	16¼
22	36 x 96	22½	33⅔	28	24 x 96	12½	12⅔
22	40 x 96	22½	37¾	28	26 x 96	12½	13½
23	24 x 84	20½	18	28	28 x 96	12½	14½
23	26 x 84	20½	19½	28	30 x 96	12½	15½
23	28 x 84	20½	21	28	32 x 96	12½	16½
23	30 x 84	20½	22½	28	36 x 96	12½	18½
23	32 x 84	20½	24				

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